

July 1965



REPORT

To

President
Lyndon B. Johnson

CONSERVATION of the NATURAL RESOURCES of NEW ENGLAND

The Passamaquoddy Tidal Power Project and
Upper Saint John River Hydroelectric Development

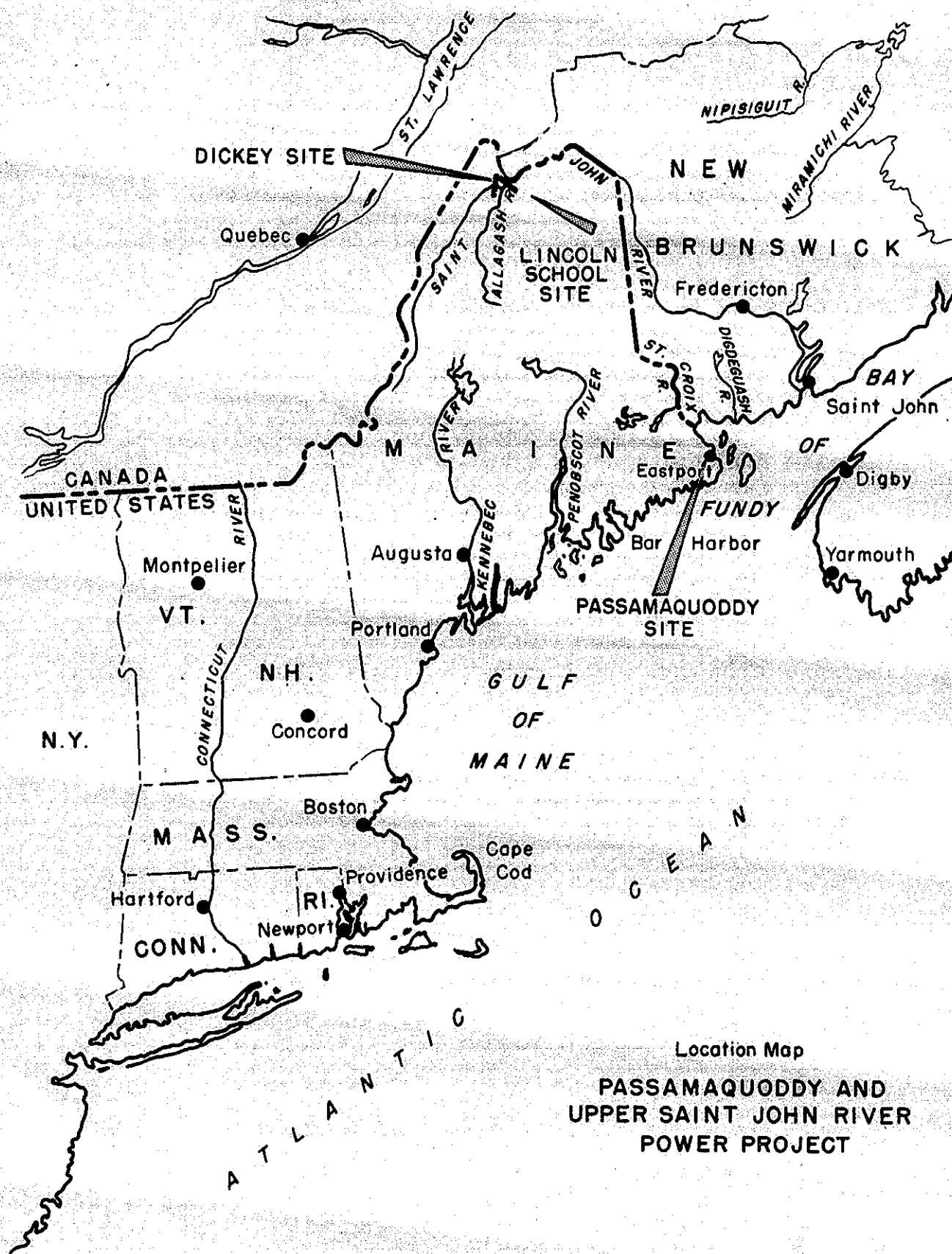
Stewart L. Udall, Secretary
U. S. Department of the Interior



This report was prepared in conformance with the Policies, Standards, and Procedures in the Formulation, Evaluation and Review of Plans for Use and Development of Water and Related Land Resources, Senate Document 97, 87th Congress, which was approved on May 15, 1962 for application of the Departments of the Army; Agriculture; Health, Education and Welfare; and Interior in water resource planning and by the Bureau of the Budget in reviewing proposed programs and projects of the Federal Government.

TABLE OF CONTENTS

	<u>PAGE</u>
Letter to President	I
Report of Advisory Board	II
Summary and Analysis of Interested Federal Agencies	III
Summary of Comments Submitted by New England States	IV
Letters of Comments from Federal Agencies	V
1. Department of the Army	
2. Federal Power Commission	
3. Department of Agriculture	
4. Atomic Energy Commission	
5. Department of Commerce	
6. Department of Labor	
7. Department of Health, Education & Welfare	
8. Department of the Treasury	
9. Department of State	
Letters of Comments Submitted by Governors of New England States	VI
1. Maine	
2. Massachusetts	
3. New Hampshire	
4. Connecticut	
5. Vermont	
6. Rhode Island (none submitted)	





UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

July 9, 1965

Dear Mr. President:

In May 1961, the late President John F. Kennedy instructed the Department of the Interior to review the report of the International Joint Commission, United States and Canada, on the International Passamaquoddy Tidal Power Project and the Upper Saint John River Hydroelectric Power Development. A Passamaquoddy-Saint John River Study Committee was established immediately and made its initial report in July 1963. At that time, President Kennedy instructed my Department and the U.S. Army Corps of Engineers to complete additional engineering studies on the project.

In August 1964, the Passamaquoddy-Saint John River Study Committee, working in conjunction with other Federal agencies, completed its evaluation of the comprehensive development of the Passamaquoddy Tidal Power Project and the Upper Saint John River Hydroelectric Power Development. As specified in Senate Document No. 97, 87th Congress, the report has been circulated to interested Federal agencies and the Governors of the New England States for their review and comment. These comments are enclosed in this report, together with a summary and analysis of their views.

During the course of the three-year study and the subsequent review of the comments of the Federal agencies and the Governors, the Committee finds that a comprehensive development of the natural resources of New England, a region which has been neglected in resource development for many years, should be initiated immediately. I concur in this view and, by this report, I am transmitting the Committee's findings and my recommendations to you.

COMMITTEE FINDINGS

The Federal Power Commission's 1964 National Power Survey clearly established that electric power rates in New England were very high, being 28 percent above the national average. Furthermore, that report set out guidelines for future development which would tend to improve the power supply situation in the region and, at the same time, substantially reduce power costs and power rates--currently among the highest in the nation.

Comprehensive development of the water and power resources of New England will take the combined efforts of public and private sectors of the electric utility industry working cooperatively with the Federal Government. Such a comprehensive plan is needed to produce the following:

1. The immediate development of low-cost Federal hydro-electric power in the New England area to reduce power costs and rates, to increase electric consumption, and to improve substantially all segments of the power industry and the region as a whole.
2. Intensified efforts to create additional outdoor recreational resources for the populous New England area.
3. Development of a fully integrated and interconnected electrical network which ties together the New England States and which can be integrated with the electrical system of the neighboring Provinces of Canada. There are mutual advantages to both nations to meet the growing power needs of the future. The United States portion of an international electrical integration system could be cooperatively developed by Federal, non-Federal agencies, and consumer-owned and private utilities in a manner similar to the Pacific Northwest-Pacific Southwest Intertie.
4. The integration and development of efficient and large fossil fuel or nuclear powered base-load steam electrical plants by consumer-owned and private utilities.
5. The long-term development and redevelopment of the hydroelectric potential of the New England States for the production of peaking power utilizing the new axial flow turbine for low-head installations. The development of pumped storage sites in conjunction with hydroelectric sites should also be considered for the region. Load and resource studies show that by 1980 there will be a requirement of about 36 million kilowatts in New England, the Maritime Provinces of Canada, and upper New York State, of which 4 million kilowatts will be needed for peaking purposes. Although hydroelectric power is and will continue to provide base load energy, its value and unique suitability will be for peaking purposes in conjunction with the development of new larger nuclear and fossil fuel thermal units in New England.

6. After conferring with the Department of Commerce, it was agreed that, provided it qualified under the criteria of Title V of the proposed Public Works and Economic Development Act of 1965, every effort would be made to establish a regional planning commission comprised of local State agencies, assisted by representatives of the Federal Government to accelerate the economic development of New England. Water resource development in New England will, of course, contribute greatly to a healthy economic environment creating local and regional benefits.

THE PASSAMAQUODDY-SAINT JOHN PROJECT

The proposed International Passamaquoddy Tidal Power Project and the Upper Saint John River Hydroelectric Power Development are shown on the frontispiece. The Passamaquoddy Tidal Power Project would comprise some 7 1/2 miles of dikes with appurtenant locks and gates to form an upper and lower pool; ultimately two powerplants, of 500,000-kilowatts each would be located between the upper and lower pools. The Upper Saint John River Development would comprise the Dickey Dam with a 760,000-kilowatt powerplant, an earth-filled structure located on the Saint John River directly above its confluence with the Allagash River and the Lincoln School reregulating dam with a 34,000-kilowatt powerplant. The estimated cost of the proposed Passamaquoddy Tidal Power Project with one 500,000-kilowatt powerplant is \$586 million. The estimated cost of the Dickey-Lincoln School Dams is \$227 million. For both Passamaquoddy and Dickey-Lincoln School Dams, the estimated cost of the transmission system is \$87 million.

The power benefits used in the economic analysis in the August 1964 report were based upon power value estimates furnished by the Federal Power Commission in December 1963. These estimates were based on the costs of steam-electric units of 100,000-kilowatts capacity in Maine costing \$180 per kilowatt and units of 325,000-kilowatts capacity in the Boston area costing \$150 per kilowatt. At-market values, on the basis of these costs, were computed to be \$29.50 per kilowatt-year and 3.3 mills per kilowatt-hour in Maine, and \$26.00 per kilowatt-year and 2.8 mills per kilowatt-hour in the Boston area. The report utilized a composite power value of \$27.70 per kilowatt-year and 3.0 mills per kilowatt-hour which is essentially an averaging of these values. In the early years, more of the power would be used in the Boston area but, as loads in Maine grow, an increasing part of the output of these projects would undoubtedly be utilized to serve loads in that State.

Based on the Federal Power Commission power values and the 3 percent interest rate in use at that time for Federal water resource projects, the annual benefits, costs, and benefit-cost ratio of the proposed developments would be:

	Dickey - <u>Lincoln School</u>	<u>Passamaquoddy</u>	<u>Combined</u>
Annual Benefits	\$25,137,000	\$21,722,000	\$46,859,000
Annual Costs	11,162,000	20,794,000	31,956,000
Benefit-Cost Ratios	2.25	1.04	1.47

Since the initiation of this study, in 1961, the utility industry has developed generating units of 500,000-kilowatts capacity which are now scheduled for installation in the Boston area, and a unit of 125,000-kilowatts capacity is being installed in Maine. New steam-electric plants in the Boston area are estimated to cost \$125 per kilowatt and plants in Maine \$140 per kilowatt. On the basis of these larger more economical developments which have taken place during the course of these studies, the Federal Power Commission on February 16, 1965 furnished revised power values for application in Maine and the Boston area. The revised at-market values were computed to be \$22.50 per kilowatt-year and 2.3 mills per kilowatt-hour in the Boston area, and \$24.50 per kilowatt-year and 2.9 mills per kilowatt-hour in Maine. A composite power value would be \$23.50 per kilowatt-year and 2.6 mills per kilowatt-hour. Using this value and the applicable interest rate of 3 1/8 percent, the annual benefits, costs, and benefit-cost ratios of the proposed developments were as shown below:

	Dickey - <u>Lincoln School</u>	<u>Passamaquoddy</u>	<u>Combined</u>
Annual Benefits	\$21,480,000	\$19,117,000	\$40,597,000
Annual Costs	11,550,000	21,400,000	32,950,000
Benefit-Cost Ratios	1.86	0.89	1.23

On July 1, 1965, the interest rate prescribed for Federal water resource projects was set at 3 1/4 percent. On this basis, the annual benefits, costs, and benefit-cost ratios of the proposed developments would be as shown below:

	<u>Dickey - Lincoln School</u>	<u>Passamaquoddy</u>	<u>Combined</u>
Annual Benefits	\$21,480,000	\$19,117,000	\$40,597,000
Annual Costs	11,890,800	22,120,000	34,010,800
Benefit-Cost Ratios	1.81	0.86	1.19

In every instance, the combined Passamaquoddy-Dickey-Lincoln School project has a benefit-cost ratio greater than unity. However, in conformance with current practice for project formulation, each unit must have a benefit-cost ratio equal to or greater than unity. As indicated in the above tables, Passamaquoddy benefit-cost ratio is now less than unity.

During the continuing study and review of the Passamaquoddy Tidal Power Project, it has been suggested that there exist alternatives which would provide lower cost power for the region. This results from the marked reduction in the cost of production of power by both nuclear and large conventional steam-electric plants and higher Federal interest rates. The tabulation below shows estimated costs of capacity and energy from Passamaquoddy and Dickey and for comparison the corresponding power values determined by the Federal Power Commission and Atomic Energy Commission to return project costs:

	<u>Capacity Charge \$/Kw-Yr.</u>	<u>Energy Mills/KWH</u>
Latest FPC Power Values (Base Load)	23.50	2.6
Passamaquoddy & Dickey (Peaking)	20.50	3.0
Passamaquoddy (Peaking)	37.75	3.0
Dickey (Peaking)	15.50	3.0
Nuclear (Base Load)	25.00 - 28.00	1.6 - 1.7

The above tabulation clearly demonstrates that the Dickey-Lincoln School project will produce low cost power for the State of Maine and for New England. The project would have an installed capacity of 794,000-kilowatts and would generate over 1 billion kilowatthours annually. Power can be delivered to preference customers in Maine for 7 to 8 mills per kilowatt-hour and peaking power can be delivered for \$15.50 per kilowatt-year for capacity and 3 mills for energy. Preference customers in New

England are now paying between 9 and 20 mills for their power supply. Thus, the Dickey-Lincoln School project can contribute low-cost load factor power for Maine and low-cost peaking power for the remainder of the New England region, which should tend to reduce rates.

Continued study has revealed that at this time the early construction of the Dickey-Lincoln School Dams and an EHV grid for the region afford the best means to lower the power rates in the New England area.

RECOMMENDATIONS

Based on a four-year study of the natural resources of New England in conjunction with the International Passamaquoddy Tidal Power Project and hydroelectric development of the Upper Saint John River, the Committee recommendations are as follows:

1. Immediate authorization, funding, and construction of the Dickey and Lincoln School projects on the Saint John River and their associated transmission system. Construction would be contingent upon completion of necessary arrangements with the Canadian Government. This would also have the immediate and major by-product of preserving the famed Allagash River in Maine, one of the few remaining wild rivers east of the Mississippi River.

2. Authorization of continued study, re-examination, and possible redesign of the Passamaquoddy Project taking full advantage of the latest technological advances with possible reductions in capital costs. Further consideration should be given to the economic benefits of Passamaquoddy associated with recreation, economic development and elimination of poverty in the region--as well as its uniqueness and contribution to technology and creation of a new source of energy for the United States. This study should be related to an extra-high-voltage transmission grid in New England. Any study of an EHV grid for New England should consider participation of Federal, non-Federal public, and privately owned utilities in a joint venture and the benefits that could accrue from further coordination of the transmission network with systems of neighboring Provinces in Canada.

3. Preservation and development of the famed Allagash River for recreational use by the Federal Government, the State of Maine, or cooperatively by the State and Federal Government on a matched funds

basis. Preservation of the Allagash should include acquisition of sufficient land in public ownership surrounding the River to insure its preservation in perpetuity, and recreational usage and attendant development should be consistent with the wild-rivers concept. Additional efforts should also be instituted to increase the recreational potential of Dickey Dam, to develop other recreational resources in Maine, particularly in Washington County, to review recreational potential at existing Federal flood control projects in New England and to plan for inclusion of recreational resources at future Federal projects where feasible.

4. The Roosevelt International Park Commission has under consideration recommendations to the two governments for a more extensive improvement program which would affect the jointly-owned property and other parts of Campobello Island. In accordance with your objective of a cooperative review and planning of the region's recreational and other resources, full and sympathetic consideration should be given to any recommendations by the Commission in which the United States would share responsibility for action with the Canadian Government under the terms of the Agreement establishing the Park.

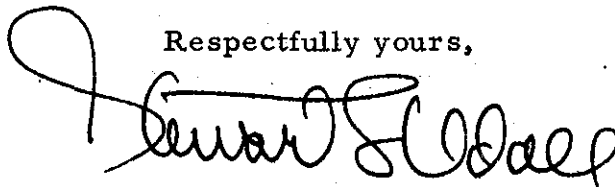
5. The Federal Government, in full participation with State and Regional Planning Groups, should continue and intensify a comprehensive program already planned and initiated for the multiple-use of the area's natural resources including river reregulation, outdoor recreation, hydroelectric development, fish and wildlife conservation, particularly by restoration of the Atlantic salmon fisheries, municipal and industrial water supply, and other constructive uses. This review should also consider the impact of natural resource development on the over-all economic improvement of New England.

I concur in these recommendations and urge their implementation. The recommendations of the Committee can provide the basis for the Federal portion of the investment needed to develop the neglected resources of New England, to provide for better and lower cost electric service to consumers and industry in the New England States, and to provide a substantial economic stimulus for the economic redevelopment of the region.

The Department of the Interior recognizes that there are many major problems to be overcome in the efficient conservation and creative

restoration of the natural resources of New England, but it is equally convinced that further delay will impede the success of that effort and will substantially increase the costs of such a program in future years.

Respectfully yours,



Secretary of the Interior

The President
The White House
Washington, D. C.

Enclosure

REPORT OF ARMY-INTERIOR ADVISORY BOARD

Army-Interior Advisory Board
on
Passamaquoddy and Upper Saint John River
Office of the Chairman
c/o Chief of Engineers, U. S. Army
Washington, D. C. 20315

11 September 1964

Honorable Stewart L. Udall

The Secretary of the Interior

Dear Mr. Secretary:

Reference is made to:

a. Letter from the Chief of Engineers, U. S. Army to the Secretary of the Interior dated 29 July 1963 and reply thereto dated 30 July 1963, which established the Army-Interior Advisory Board on Passamaquoddy and Upper Saint John River and assigned it the task of providing advice and guidance to the field agencies making supplemental studies. Subsequently, the Secretary of the Interior with the concurrence of the Chief of Engineers enlarged the Board to its present complement of fourteen representatives. Four of these representatives were designated by their respective agencies to serve as observers.

b. Reports of the Advisory Board to the Secretary of the Interior and the Chief of Engineers dated 1 October 1963 and 31 December 1963 covering interim activities of the Board.

The Board has visited the sites of the proposed Dickey and Lincoln School projects on the Upper Saint John River and the Passamaquoddy project near Eastport, Maine. In addition, the Board has reviewed the field and office engineering studies for these projects and has furnished advice and guidance to the Corps of Engineers on these studies as they progressed. A representative of the Chief Engineer of the Bureau of Reclamation made a detailed review of the cost studies of the Corps of Engineers and furnished advice on the preparation of the final estimates. The Bureau of Reclamation also participated in the studies leading to the selection of the turbine used in the plans and cost estimates for the Passamaquoddy project. The Board notes that the estimates of the Corps of Engineers are in general agreement with those presented in the July 1963 report by the Department of the Interior.

The Board has also reviewed the studies by the Department of the Interior on economic aspects. The Board furnished advice and guidance to the Department of Interior on questions raised as the studies proceeded,

11 September 1964

particularly on the application of procedures for project formulation contained in Senate Document No. 97, on the incremental justification of the tidal component and the evaluation of alternative means of achieving the same purposes. The Board notes that the power values utilized in the economic studies as well as the suggestion to utilize reversible turbine units in the tidal powerplant were furnished by the Federal Power Commission.

The services of the Board, as intended, were of an advisory nature and ample opportunity was afforded for discussion of the studies as they progressed. The Board also considers that the scope of the supplemental studies of the two agencies was responsive to the suggestions offered by the Board.

Inasmuch as the report of the Secretary of the Interior will be referred to the agencies represented by the individual members of the Board, it did not appear appropriate for members of the Board to offer comments on the final conclusions of the two agencies. The concluding Report of the Secretary therefore was not referred to the Board for review.

The Board considers that it has discharged the duties assigned to it by the Secretary of the Interior and the Chief of Engineers and wishes to express its appreciation for the opportunity to participate in this undertaking.

Respectfully submitted,



Morgan Dubrow
Department of the Interior



N. B. Bennett
Bureau of Reclamation



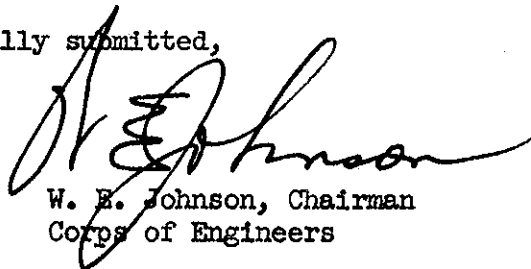
H. C. C. Weinkauf
Corps of Engineers



J. E. Guidry
Department of the Interior



F. L. Thrall
Corps of Engineers



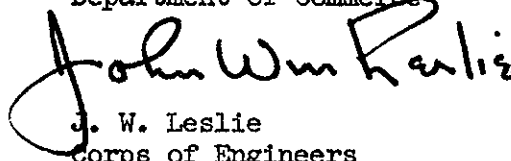
W. E. Johnson, Chairman
Corps of Engineers



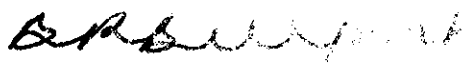
F. S. Brown
Federal Power Commission



D. A. Portner
Department of Commerce



J. W. Leslie
Corps of Engineers



B. P. Bellport
Bureau of Reclamation



UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

JAN 29 1965

Dear Mr. Johnson:

This will acknowledge receipt of your letter of September 11, 1964 signed by the members of the Army-Interior Advisory Board, advising that it considers to have fully discharged the duties assigned to it by the Chief of Engineers, U. S. Army, and myself, and that ample opportunity was afforded for discussion of the studies as they progressed.

Certainly, the Board has performed an outstanding service and has made a significant contribution toward the evaluation of the Passamaquoddy Tidal Power Project and the Upper Saint John River Hydroelectric Power Development by its considerations and advice which I understand is reflected in the report entitled "Supplement to July 1963 Report - The International Passamaquoddy Tidal Power Project and Upper Saint John River Hydroelectric Power Development" dated August 1964, prepared by the Passamaquoddy-Saint John River Study Committee.

I thank you as Chairman of the Board and I thank each individual member for his contributions along the line. I plan to include the Board's report in my final report to the President and to the Congress.

Sincerely yours,

Secretary of the Interior

Mr. W. E. Johnson, Chairman
Army-Interior Advisory Board on
Passamaquoddy and Upper Saint John River
c/o Chief of Engineers, U. S. Army
Washington, D. C. 20315

**SUMMARY AND ANALYSIS OF COMMENTS
BY INTERESTED FEDERAL AGENCIES**

DEPARTMENT OF THE ARMY

The Chief of Engineers considers that construction of the Passamaquoddy Tidal Power Project can be separate and apart from the Dickey Project and concludes that since the economics of the Dickey Project are superior to the tidal project, it, or a suitable alternative on the Upper Saint John River, should be developed first. These views are premised on the fact that the dependable capacity and the energy of the tidal plant can be maintained whether the river hydro development is available or not.

ANALYSIS

These views are consistent with the recommendations contained in this report.

FEDERAL POWER COMMISSION

The Commission believes that the proposed Passamaquoddy-Dickey-Lincoln School developments result in substantial economic improvement compared with the plans presented in the 1961 report of the International Joint Commission. The Commission also indicates that with the introduction of reversible units at Passamaquoddy and some additional pumping, the project can meet peak loads for as long as four hours duration.

On the other hand, the Commission believes that the economic feasibility of the Passamaquoddy Tidal Power Project, even with the improvement in economics afforded by operation for peak-load use and by using reversible inclined-axial type units, is marginal at best. The rates required to repay the power costs within 50 years would be higher than the cost of producing power at alternative steam-electric plants. The Commission also states that the alternative power cost from privately financed sources must be examined at frequent intervals as larger thermal units are introduced into the various New England power systems.

The Commission believes that the Dickey-Lincoln School developments are economically well justified and merit early construction. The development of such clearly economic hydroelectric projects in New England could serve the important objective of reducing the electric power costs in a region where such costs are now among the highest in the nation.

The Commission agrees that comparisons of the project with alternatives which are comparably financed, i. e. federally financed, should not be governing because such financing and construction of alternative power sources cannot reasonably be anticipated.

ANALYSIS

Basically, the Passamaquoddy-Dickey-Lincoln School Project was examined and developed in the light of the original request by President Kennedy on May 20, 1961 to review the International Joint Commission's report for the purpose of reporting on changes in fuel, engineering and financing cost, which would be necessary in order for the project to become feasible and, second, to advise on hydroelectric power developments on the Upper Saint John River in Maine. The August 1964 report meets the objective set out in terms of the initial assignment.

DEPARTMENT OF AGRICULTURE

The Department of Agriculture notes that its interest in the project area relates to forests and timber production, the availability of hydroelectric power for rural electric cooperatives, and the short and long-term benefits to the agricultural economy of the area. The Department concludes that the project will provide specific benefits in each area of interest and endorses the project development plan. The Department specifically requests that transmission arrangements to serve rural electric systems be made and that the Woodstock (New Hampshire) pumped storage site be considered for development as part of the project plan.

ANALYSIS

As cited by the Department of Agriculture, the consumer-owned electric systems of New England are substantially disadvantaged in their present operations and growth potential by high wholesale power costs. If the recommendations of the report are adopted, lower cost power would be available to these systems under the Federal preference laws and adequate transmission arrangements to serve preference customers will be made. The short and long-term area redevelopment benefits to the agricultural economy of the project area suggested by the Department of Agriculture are in addition to the area redevelopment benefits considered by the Department of the Interior.

ATOMIC ENERGY COMMISSION

The Atomic Energy Commission indicates that in comparing the proposed project with nuclear electric plants that it might have been better to use two 625-Mw plants or three 430-Mw plants whereas in the report we considered 300, 430 and 625-Mw plants, respectively. The Chairman indicates that this would result in a somewhat lower capacity charge for the nuclear alternative and would provide a more realistic comparison without undue compromise in the dependability of the nuclear alternative. The Chairman also indicates that steam plants for the nuclear or privately financed plants would initially cost around one-fifth of the proposed cost of the hydro project. The Atomic Energy Commission further suggests that a nuclear electric plant would be capable of producing more energy.

ANALYSIS

The Dickey-Lincoln School project which is being recommended will produce lower-cost power than a nuclear alternative.

DEPARTMENT OF COMMERCE

The Department of Commerce considers the Dickey-Lincoln School portion of the Passamaquoddy-Saint John River Project as being economically justified. Serious reservations, however, are expressed for construction of the combined Passamaquoddy-Upper Saint John River Power Development. It was suggested that Passamaquoddy could be more logically justified in the same terms used for the space program--national prestige, technological advances and engineering ability.

ANALYSIS

The Dickey-Lincoln School project is being recommended, and action on the Passamaquoddy project is being deferred pending further study. The basic reservation stated in the Department of Commerce letter is that there is not adequate consideration given to the alternative sources of power in New England. It also indicated that while tourism in the Passamaquoddy area might be stimulated, the project's net contribution to area redevelopment other than in the construction phases is minor and transitory. The Department of Agriculture and the Governor of Maine considered the area redevelopment benefits to be greater than those considered in the report.

DEPARTMENT OF LABOR

The Department of Labor endorses the project on the basis that it will provide additional recreational and tourist facilities in the area and will result in an appreciable increase in job opportunities over a period of years in the service industries.

ANALYSIS

On the assumption that the project is otherwise economically sound and feasible and meets the standards set forth in pertinent laws, the Department of Labor endorses the project. It also indicates that the construction of the project will provide additional recreation and tourist facilities in the area and will result in an increase in job opportunities.

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

The Department of Health, Education and Welfare finds that the information in the subject report and other reports indicated has been found most interesting and helpful in recent studies, which have given attention to sanitation problems, and possible effects of the tidal project on dissipation of residual pollution in the tidal estuary of the St. Croix River.

From these studies, it is concluded that these problems can be satisfactorily resolved, and that they can be effectively taken care of prior to or in conjunction with the construction of the International Passamaquoddy Tidal Power Project.

ANALYSIS

The Department of Health, Education and Welfare letter obviously indicates that there are no existing pollution problems which would be adversely affected by the construction of the International Passamaquoddy Tidal Power Project.

DEPARTMENT OF THE TREASURY

The Department of the Treasury takes exception to use of the current 3-1/8 percent interest rate in accordance with the formula for project formulation under Senate Document 97, 87th Congress, Second Session, on the basis that it was never consulted on this formula and recommends that an interest rate of 4-1/4 percent be used. The Department further states that this measure of the Government's borrowing cost was adopted by the Treasury more than a decade ago and was endorsed early last year in the Report of the President's Committee on Federal Credit Programs.

The Department of the Treasury states that based on the 4-1/4 percent discount rate, the Dickey-Lincoln School project has a benefit-cost ratio of 1.7 and, consequently, would appear to warrant further consideration. On the other hand, considered apart from the Dickey-Lincoln School project and using the 4-1/4 percent discount rate, the Passamaquoddy project has a benefit-cost ratio of less than one.

ANALYSIS

The Department of the Treasury takes exception to the use of 3-1/8 percent interest rate in the project formulation and its economic analysis determined in accordance with the formula under Senate Document No. 97. This is the interest rate used in project formulation currently being used for economic analysis of all water resource projects throughout the United States. This interest rate was furnished the Department of the Interior by the Department of the Treasury on July 8, 1964. The Federal interest rate for water resource projects was raised to 3-1/4 percent by the Treasury on July 1, 1965. The recommendations of the Secretary of the Interior in this report take this increase into consideration.

DEPARTMENT OF STATE

The Department of State indicates both phases of this project involve the participation of the Government of Canada. Portions of the proposed tidal power project are in Canadian territory and the Upper Saint John River development will affect the flow of the lower portion of the river which lies in Canada.

The Department of State further notes that since internal United States Government consideration is not completed, formal negotiations with the Canadian Government on specific proposals are not yet feasible. When the review of the report is completed and it has been approved by the President, the Department of State would be happy to propose to the Canadian Government formal negotiations if that should be deemed desirable.

ANALYSIS

The Department of the Interior agrees with the Department of State that formal negotiations with the Canadian Government should be made at the appropriate time.

**SUMMARY OF COMMENTS SUBMITTED BY
AFFECTED STATES**

STATE OF MAINE

Governor Reed strongly endorsed the Passamaquoddy-Saint John River Project and expressed his conviction that it not only will serve the national interest but will benefit the State of Maine, the New England States and the Maritime Provinces of Canada, now and in the future. He stated his further belief that the Passamaquoddy-Saint John River Project, with its transmission line from the Maine-Canadian borders to Southern New England, could be the cornerstone of a great international Northeast Power Grid stretching from the Atlantic Provinces of Canada to New York State, where it would be connected with similar strategic power grids now being perfected to serve major areas of this Nation and Canada.

The Governor enlarged his initial statements to include significant comments from several officials of the Maine State Government to the effect that the recreation, tourism and Area Redevelopment Benefit estimates used in the report are too low and, further, no realistic appraisal is made of the transportation, commercial, and recreational benefits which the road construction, resulting from the project, would produce.

COMMENT

Any revision of the values utilized in the report should take fully into account the comments of the Governor of Maine and the heads of his departments of state government.

STATE OF MASSACHUSETTS

Governor Peabody advised of his full support of the project. He stated that his enthusiastic support is based on the promises of the project for an economic uplift for all of New England in bringing into being a project of the magnitude given in the past frequently to southern and western sections of the country.

STATE OF NEW HAMPSHIRE

Governor King states that the proposed Passamaquoddy Project has his complete and unequivocal support. He expresses his deep concern that New Hampshire power rates are the highest in the entire United States and hopes that the Congress will take positive action on the project which could substantially ease the present problems.

STATE OF CONNECTICUT

Governor Dempsey feels that anything that would benefit a part of a region such as New England would benefit the entire region although it would have no direct effect on the State of Connecticut. He is awaiting with interest the report of a study on power rates being conducted by a committee appointed by the New England Governors Conference with Governor Philip Hoff of Vermont as chairman.

STATE OF VERMONT

Governor Hoff endorses the early construction of the Dickey-Lincoln School project and further urges that early consideration be given to the planning and development of a regional transmission grid.

COMMENT

The recommendations of the Secretary of the Interior take into account the advisability of a New England Grid which is recommended by Governor Hoff.

No Comment Was Received From The
Governor of Rhode Island

X X X

LETTERS OF COMMENT

FROM FEDERAL AGENCIES



HEADQUARTERS
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20315

IN REPLY REFER TO
ENGCW-PM

25 November 1964

The Honorable Stewart L. Udall

The Secretary of the Interior

Dear Mr. Secretary:

This is in response to your letters of 11 August 1964 in which you requested the views and comments of the Secretary of the Army and the Chief of Engineers on the August 1964 report of the Passamaquoddy-Saint John River Study Committee entitled "Supplement to July 1963 Report, The International Passamaquoddy Tidal Power Project and Upper Saint John River Hydroelectric Power Development."

Power studies and investigations of transmission, marketing, and economic aspects of the Passamaquoddy-Upper Saint John River Development presented in the report have been prepared by your Department. Included with the report of the Committee is a Supplemental Engineering Report dated April 1964 which was prepared by the Corps of Engineers on cost and engineering aspects of the developments under consideration. This is in accordance with understandings between our respective agencies regarding the implementation of President Kennedy's directive of 16 July 1963. The supplemental studies made by the Corps have served to update previous cost estimates of the tidal power development in line with present day costs, and to reflect the modifications proposed by your Department. They also have established the suitability of the Dickey dam site on the Upper Saint John River for a hydroelectric storage development, and have determined the approximate cost of such a project.

Certain significant differences between the projects presented by the Committee and as studied by the International Joint Commission are to be noted. One of these is that your Committee has investigated possibilities of marketing the power over an expanded area in New England, and has presented a plan by which it is proposed to market the output of both the river hydro and tidal components in the near future. The installation of reversible axial-flow generating units in lieu of Kaplan units is also proposed. Another important difference is your proposal to develop storage on the Upper Saint John River by a project at the Dickey

25 November 1964

The Honorable Stewart L. Udall

site in lieu of the Rankin Rapids project presented by the International Joint Commission. Available information indicates the Rankin Rapids site to be the superior of the two alternative projects from the standpoint of the production of power. However, the purpose of this modification is to preserve the recreational aspects of the Allagash River.

In the economic analyses prepared by your Department a 3 percent interest rate and a 100-year period of amortization have been used. Recreation and area redevelopment benefits creditable to the developments have been included in the justification. These data have been assembled in such manner as to permit the justification of both the Dickey-Lincoln School and the Passamaquoddy projects to be examined separately.

The Dickey-Lincoln School development is shown to be economically justified by a substantial margin on the basis of the analyses presented. The ratio of benefits-to-costs is 2.25 and power can be produced at less cost than from a comparably financed alternative determined in accordance with the provisions of the statement of "Policies, Standards, and Procedures in the Formulation, Evaluation and Review of Plans for Use and Development of Water and Related Land Resources," approved by the President on 15 May 1962.

The incremental benefit-to-cost ratio for the Passamaquoddy tidal power component with 500,000 kilowatts installed is shown to be 1.04. However, the cost of power from the project is greater, by a substantial margin, than the cost of power from a comparably financed alternative determined in accordance with the referenced statement. The significance of the comparability test is that it provides a measure of the economic efficiency of the project as against that of available alternatives. Since the tidal project does not meet the comparability test, it appears that its justification must rest in part on intangible factors such as those associated with pioneering in the tidal power field, the provision of a new access to Deer Island and between the United States and Canada, etc.


It may be noted that a 3 1/8 percent rate has recently been adopted for the analyses of Federal water resource projects. The application of this rate in the economic evaluation of the projects under consideration would reduce the benefit-to-cost ratios by a small amount.

ENGCGW-PM
The Honorable Stewart L. Udall

25 November 1964

The method of operation presented by your Committee differs from that contemplated in the report of the International Joint Commission in that the tidal project presented in the Committee's report is not dependent upon close hydraulic and electrical integration with the river hydro development. The dependable capacity and the average energy output of Passamaquoddy project can be maintained under the presently proposed plan of operation whether the river hydro development is available or not. This factor permits the construction of the tidal project to be considered separate and apart from the Dickey project. The Dickey project is obviously superior to the tidal project and it, or a suitable alternative on the Upper Saint John River, should be developed first.

Sincerely yours,


W. K. WILSON, JR.
Lieutenant General, USA
Chief of Engineers

FEDERAL POWER COMMISSION

WASHINGTON 25, D.C. 20426

NOV 23 1964

Honorable Stewart L. Udall
Secretary of the Interior
Washington, D. C. 20240

Dear Mr. Secretary:

This is in response to your letter of August 11, 1964, inviting comments by the Commission relative to the August 1964 Supplement to the July 1963 Report on the International Passamaquoddy Tidal Power Project and the Upper Saint John River Hydroelectric Power Development.

Your July 1963 report, which was based on a review of the April 1961 report of the International Joint Commission, proposed (1) development of the two-pool Passamaquoddy Tidal project substantially as presented in the IJC report, except that the project would have an installation of 1,000,000 kilowatts in inclined-axis type units and would be operated for peak-load use; (2) development of a 750,000-kilowatt Dickey hydroelectric project on the Saint John River immediately upstream from the confluence with the Allagash River, in lieu of Rankin Rapids located downstream from the Allagash; and (3) construction of transmission facilities to interconnect the projects and transmit power to load centers. The combined installation of 1,750,000 kilowatts was to be operated so as to provide an assured capability of 1,250,000 kilowatts for serving a load of 250,000 kilowatts at system load factor plus a daily load of 1,000,000 kilowatts for a duration of one hour.

The August 1964 Supplement presents findings based on additional studies made by your Department and the Corps of Engineers under the guidance of the Army-Interior Advisory Board on the Passamaquoddy and Upper Saint John River Project. The August 1964 Supplement proposes (1) a Passamaquoddy Tidal Power Development with an initial installation of 500,000 kilowatts and an ultimate installation of 1,000,000 kilowatts; (2) a Dickey project with an installation of 760,000 kilowatts; (3) a reregulating reservoir and power plant at the Lincoln School site on the Saint John River downstream from the Allagash, with an installed capacity of 34,000 kilowatts; and (4) construction of transmission facilities to interconnect the projects and transmit power to load centers. Major changes from the July 1963 report include (1) the proposed installation of reversible turbines at Passamaquoddy; (2) the planned operation of the project to serve peak loads of two-hour instead of one-hour duration; and (3) the inclusion of a reregulating project at Lincoln School.

The supplementary engineering studies of the proposed developments and estimates of project costs were made by the Corps of Engineers. The estimated cost of the proposed developments, with a total of 1,294,000 kilowatts installed, is \$809 million. The planned transmission system

interconnecting the plants with load centers in Maine and in the Boston area would add an additional \$87 million, making the total estimated cost \$896 million.

The Commission reviewed the IJC report of April 1961 and transmitted its comments thereon to the Secretary of State by letter dated July 14, 1961. The Commission concluded that the International Passamaquoddy Tidal Project, either alone or in combination with auxiliary power sources, was not economically feasible at that time. It also expressed the view that it was not economically sound to combine the Tidal power project with the entire then-proposed Rankin Rapids development for the purpose of determining its economic feasibility; but that there would be no objection in principle to considering the combined projects if the Tidal project were evaluated incrementally, that is, by balancing the net additional benefits against the net additional costs.

The Commission was represented on the Army-Interior Advisory Board which furnished information and suggested guidelines for the studies made for the August 1964 Supplement. Since its function was advisory, the Board did not participate in the preparation or review of the report. The use of reversible units in the Tidal project was suggested by the Commission's representative on the Board. Such units would enhance the economics of the project and permit generation of power having characteristics that would make the power more readily marketable in the New England area.

The economic analysis given in the August 1964 Supplement shows a benefit-cost ratio of 1.47 to 1.00 for the combined Passamaquoddy-Dickey-Lincoln School developments. The benefit-cost ratio for separate development of the Dickey-Lincoln School project would be 2.25 to 1.00 and for the Tidal project, considered as an increment to this development, 1.04 to 1.00. These analyses, which are based on a 100-year period of analysis and on United States financing at an assumed interest rate of 3.0 percent, are summarized below:

	Dickey Lincoln School (794,000 kw)	Passamaquoddy (500,000 kw)	Combined (1,294,000 kw)
<u>ANNUAL BENEFITS</u>			
Power:			
At-site	\$22,688,000	\$17,823,000	\$40,511,000
Downstream (in Canada)	2,000,000	--	2,000,000
Flood Control	40,000	--	40,000
Area Redevelopment	409,000	1,869,000	2,278,000
Recreation	--	2,030,000	2,030,000
Total	\$25,137,000	\$21,722,000	\$46,859,000
<u>ANNUAL COSTS</u>			
Total	\$11,162,000	\$20,794,000	\$31,956,000
BENEFIT-COST RATIO	2.25	1.04	1.47

We note that the analysis included in the August 1964 Supplement treats Passamaquoddy as an increment to the Dickey-Lincoln School developments, and thus assigns to Passamaquoddy only about one-seventh of the total transmission costs. We understand that this large allocation of transmission costs to the Dickey-Lincoln School project assumes full development of this project prior to construction of Passamaquoddy and the necessity for transmission of a large part of the output of the Dickey-Lincoln School project to the Boston load area during the early years of project operation. This treatment does not seem objectionable in principle.

Federal Power Commission studies show that use of the interest rate of 3-1/8 percent, which is in current use for analysis of proposed Federal projects, would reduce the benefit-cost ratios of the proposed developments as shown below:

	<u>Dickey- Lincoln School</u>	<u>Passamaquoddy</u>	<u>Combined</u>
ANNUAL BENEFITS	\$25,137,000	\$21,722,000	\$46,859,000
ANNUAL COSTS	11,550,000	21,400,000	32,950,000
BENEFIT-COST RATIO	2.18	1.01	1.42

The power benefits used in the economic analyses were based upon power value estimates furnished by the Commission staff. These estimates were based on the costs of steam-electric units of 100,000 kilowatts capacity in Maine costing \$180 per kilowatt, and units of 325,000 kilowatts capacity in the Boston area costing \$150 per kilowatt. At-market values, on the basis of these costs, were computed to be \$29.50 per kilowatt-year and 3.3 mills per kilowatt-hour in Maine, and \$26.00 per kilowatt-year and 2.8 mills per kilowatt-hour in the Boston area. The report utilizes a composite power value of \$27.70 per kilowatt-year and 3.0 mills per kilowatt-hour which is essentially an averaging of these values. In the early years more of the power would be used in the Boston area but, as loads in Maine grow, an increasing part of the output of these projects would undoubtedly be utilized to serve loads in that State.

In selecting the type and size of alternative generation for use in determining power values, the Commission staff attempts to project the characteristics of the alternative generation which would be appropriate for the area or areas within the period required for project formulation and authorization. Within the past few years, the electric power industry has moved rapidly forward toward increased coordination of generation and transmission facilities. These trends, which permit use of larger unit and plant sizes, have lagged somewhat in the New England area in relation to other areas of the nation having similar load density. However, in recent months a steam-electric unit of 500,000 kilowatts capacity has

been ordered for the Boston area and a 350,000-kilowatt unit has been announced for construction in southeastern New Hampshire. Units of these sizes would of course be more economical than the units of the sizes on which the power values in the report are based.

Further emphasis on cost reduction in fossil fuel steam-electric generation has been stimulated by developments in nuclear fueled electric generation. The August 1964 Supplement contains estimates prepared by the Atomic Energy Commission for alternative nuclear generation plants. These range in size from 300 to 625 megawatts. The estimated cost of the larger plant is closely aligned with the bid price received during the year for the construction of the Oyster Creek plant in New Jersey. Actual experience in estimating and bidding on nuclear construction is limited and it may be that these costs are somewhat lower than may be experienced until the nuclear power industry in the United States has advanced to a level more comparable with other forms of generation. However, it is apparent that the cost of nuclear generation is in close range with conventional thermal generation in the New England area today.

These comments are offered to make it clear that estimates of alternative power costs must be up-dated frequently. Inasmuch as thermal power costs seem headed downward, for hydro projects such as Passamaquoddy which entail longer than average time for planning, authorization and construction, it would be appropriate to include some discounting below the alternative values which were used in the study.

The August 1964 Supplement shows the estimated costs of the Passamaquoddy project with installations of 700,000 and 1,000,000 kilowatts, in addition to the estimate with 500,000 kilowatts. However, no economic analyses are shown for the project with the larger installations. Studies by the staff show that installations larger than 500,000 kilowatts would not be economically justified.

The staff studies confirm the economic justification of the Dickey project combined with the Lincoln School reregulating development. We wish to emphasize that the Dickey-Lincoln School development is in no way dependent on the Passamaquoddy project, either operationally or for its economic justification. The Dickey project would not be as favorable for power as the previously-proposed Rankin Rapids project but it would preserve the Allagash River as a free-flowing stream for recreational use.

The August 1964 Supplement shows comparisons of the cost of power from the combined Passamaquoddy-Dickey-Lincoln School developments with the costs of power from three alternative sources assumed to be comparably financed. The alternatives are conventional steam-electric plants, nuclear plants, and pumped storage developments, all with Federal financing. All three types of alternatives were found to be capable of producing power at lower cost than the proposed Passamaquoddy-Dickey-Lincoln School projects.

The report concludes, however, that none of the alternatives would offer the equivalent in new employment and sustained economic opportunity, or the capability of conserving nonrenewable energy resources. The Commission agrees that such comparisons with alternatives should not be governing since Federal financing and construction of these alternative power sources cannot reasonably be anticipated.

The July 1963 report contemplated operation of the Passamaquoddy project to serve a peak load of one hour's duration. Studies by the staff showed that there were so many factors, such as weather conditions, which could affect the shape of the daily load curves that it would be difficult to estimate future load shapes with assurance. The studies showed that there would be no assurance of a market for a large amount of one-hour peaking capacity in New England. As a result of the further studies of marketing possibilities, the August 1964 Supplement proposes operation of the Tidal project to supply peak power of two hours' duration. With such operation, the staff studies show reasonable probability that 500,000 kilowatts of two-hour peaking capacity could be utilized in serving the loads in the New England area.

The natural head available for power generation at Passamaquoddy would vary with the tidal cycles. During extreme neap tides (when the tide range is unusually low) the tidal rise would not provide sufficient head to operate generating units at their full capability. With the planned use of reversible units, this problem would be overcome by pumping water from the lower pool to the upper pool during periods of off-peak power loads. Pumping would be required only during neap tides, and the resulting increase in head during such periods would permit the project to be operated to provide full plant capability during all peaking periods. Since pumping would be required only during periods of neap tides, the amount of energy required for pumping would be relatively small. In addition to serving a two-hour peak load, the Tidal project would produce a large amount of energy. The amount of total generation would depend upon the method of operation. If operated for peaking during three peak-load months of the year and for maximum energy production during the remaining nine months, the average annual generation would be almost two billion kilowatt-hours. This is equivalent to an annual plant factor of about 45 percent. The required pumping energy for such operation would amount to about 34 million kilowatt-hours per year.

Studies by the staff indicate that with some additional pumping, the Tidal project could be operated to serve daily peak loads of 500,000 kilowatts for up to about four hours' duration. This could be accomplished by further superelevating the upper pool during periods of neap tides by added pumping from the lower pool. It appears, therefore, that with the degree of flexibility of operation provided by the use of reversible units at Passamaquoddy, the project power could reasonably be expected to be utilized in the New England area loads.

With the planned installation of 760,000 kilowatts at Dickey, the average annual generation would be 750 million kilowatt-hours, equivalent to an annual plant factor of about 11 percent. The 34,000-kilowatt Lincoln School project would operate at a plant factor of greater than 85 percent and would generate about 260 million kilowatt-hours per year. The energy available at the Dickey project would permit use of the plant at full capability, on the average, for about four hours per day for five days per week. With the large reservoir capacity available, the project could be operated flexibly to meet varying load demands and the output should be readily marketable. The construction of the Lincoln School reregulating project would provide the opportunity to install reversible units at Dickey if needed to meet future load requirements.

The August 1964 Supplement shows an allocation of costs of the combined Passamaquoddy-Dickey-Lincoln School developments in which \$796,292,000 of the estimated investment costs are allocated to power and \$100,097,000 are allocated to area redevelopment, recreation, and flood control. It is stated that the costs allocated to power, with interest at 3.0 percent^{1/}, could be repaid within 50 years after each unit becomes revenue producing by selling the power at at-market rates of \$19.75 per kilowatt-year for capacity and 3.0 mills per kilowatt-hour for energy. These rates reflect an annual revenue credit of \$2 million for downstream generation in Canada. Individual repayment analyses for the Dickey-Lincoln School and Passamaquoddy projects are not shown in the Interior report.

Such studies, made by the Commission's staff, using an interest rate of 3-1/8 percent, show that the total costs of the Dickey-Lincoln School developments as an initial undertaking could be repaid within 50 years with at-market rates of about \$15.00 per kilowatt-year and 3.0 mills per kilowatt-hour, without any revenue credit for downstream generation in Canada. If the costs allocated to area redevelopment and flood control are assumed to be nonreimbursable, the rate for capacity would be only \$14.50 per kilowatt-year. These rates would be reduced by any payments received for downstream benefits.

Similar studies were made for the Passamaquoddy project considered as an increment to the Dickey-Lincoln School developments. At-market rates of about \$36.75 per kilowatt-year and 3.0 mills per kilowatt-hour would be required to repay within 50 years the costs allocated to power in the August 1964 Supplement. If costs allocated to recreation are assumed to be nonreimbursable only to the extent provided in the proposed Bill, H. R. 9032, 88th Congress, the rates would be increased to about \$38.25 per kilowatt-year and 3.0 mills per kilowatt-hour. H. R. 9032 embodies the recommendations for uniform cost-sharing and reimbursement

^{1/} The currently approved rate of 3-1/8 percent was not in effect at the time the Interior report was prepared.

Honorable Stewart L. Udall

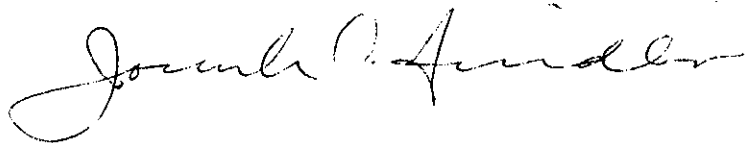
- 7 -

policies for recreation and fish and wildlife, which were made to the Congress in the Bureau of the Budget's letter of November 2, 1963. The above rates for Passamaquoddy power would be about 25 percent higher than the at-market costs of producing power from alternative new steam-electric plants.

The Commission has made no independent estimates of project costs or non-power benefits. However, based on its consideration of the reports and studies of your Department and the Corps of Engineers and on the power value and market studies of its own staff, the Commission concludes that the proposed plans for the Passamaquoddy-Dickey-Lincoln School developments result in substantial economic improvement in comparison with the plans presented in the 1961 report of the International Joint Commission. The Commission believes that the economic feasibility of the Passamaquoddy Tidal project, even with the improvement in economics afforded by operation for peak-load use and by using reversible inclined-axis type units, is marginal at best. The rates required to repay the power costs within 50 years would be higher than the cost of producing power at alternative steam-electric plants.

The Commission believes that the Dickey-Lincoln School developments are economically well justified and merit early construction. The development of such clearly economic hydroelectric projects in New England could serve the important objective of reducing the electric power costs in a region where such costs are now among the highest in the nation.

Sincerely,

A handwritten signature in dark ink, appearing to read "Joseph C. Swidler". The signature is fluid and cursive, with a large initial "J" and a long, sweeping underline.

Joseph C. Swidler
Chairman



DEPARTMENT OF AGRICULTURE
WASHINGTON 25, D.C.

December 24 1964

Honorable Stewart L. Udall
Secretary of the Interior

Dear Mr. Secretary:

This is in reply to your letters of February 7 and August 11, 1964, requesting our comments on the July 1963 report and August 1964 supplement to the report submitted by the Secretary of the Interior to the President on the proposed International Passamaquoddy Tidal Power Project and the Upper Saint John River Hydroelectric Power Development.

The report recommends a project comprised of the Passamaquoddy Tidal Power Development with an initial installation of 500-Mw and an ultimate installation of 1,000 Mw; the Dickey reservoir on the Saint John River and powerplant with an installed capacity of 760-Mw; the Lincoln School re-regulating reservoir and powerplant with an installed capacity of 34-Mw; and a transmission system interconnecting these plants and delivering power to load centers in Maine and in the vicinity of Boston, Massachusetts.

The estimated cost of the project is approximately \$896 million, including a transmission system at a cost of \$87 million. The annual benefits are estimated to be \$46.86 million, of which \$42.51 million would be power, \$2.03 million recreation, \$2.28 million area redevelopment and \$0.04 million flood control benefits within the United States. The benefit-cost ratio is calculated to be 1.47 to 1.0 on the basis of a 100-year period of analysis with interest at 3 percent, with 90 percent of the cost allocated to power. It is estimated that these costs would be repaid from power revenues within a period of 50 years after each unit becomes revenue producing, with interest at 3 percent per annum on the unpaid balance.

The interest of this Department in the area to be affected by the project is principally in the effects of the project upon forests and timber production and the relationship of the hydroelectric power produced to the interests of the rural electrification systems marketing power from the installations.

The report points out that the 81,000 acres of forested land required for the project were appraised by an appraiser familiar with timberlands

in the region. For project cost purposes an allowance was made for the value of standing wood growth and also for severance. Severance costs provide an equal access in cases where present access would be flooded out. It therefore appears that non-Federal resource values are being considered and protected as much as possible. There are no National Forests within or near the project areas.

In New England, forest industries--particularly those producing pulp and paper as an end product--are important. In Maine, this industry dominates the economy, accounting for one-third of the industrial workers in the State. This diversified regional industry, which also produces lumber and various other forest products in addition to pulp and paper, and which is directly aided by the resource management, marketing, and research programs of this Department, will materially benefit from the cheap sources of additional power made available through completion of the proposed project.

This Department, on behalf of the rural electrification systems in New England financed by the Rural Electrification Administration, concurs in and endorses the proposed plan of development as set forth in the August 1964 supplemental report. These systems, located in Maine, New Hampshire and Vermont, are substantially disadvantaged both in their present operations and their growth potential by high wholesale power costs which would be mitigated by the estimated cost of power under the development plan. Their power and energy requirements for 1980, the load analysis year used in the supplemental report, are estimated at 110,000 KW and 420,000,000 KWH above the amounts of power and energy now allocated to them from the St. Lawrence and Niagara developments of the New York State Power Authority.

In order for them to exercise their preference rights and make effective use of the project power, it will be necessary to include in the project provision for transmission to their service areas at minimum delivery cost. We urge further consideration of development of the Woodstock Pumped Storage Power Plant in New Hampshire and its connection to the Passamaquoddy-Dickey project. This would maximize the benefits of the project to REA borrowers in New Hampshire and Vermont and would facilitate beneficial interconnections with the St. Lawrence and Niagara power facilities.

There are no Public Law 566 projects in the area affected by the Upper St. John hydroelectric power development and none are anticipated at this time, since the watershed is practically all sparsely populated and undeveloped area. There are several P. L. 566 projects in the St. John River watershed downstream from the proposed power development sites. There are other projects for which requests for planning assistance have been made to this Department. None of these projects will be affected by the power development. No watershed projects are anticipated in the vicinity of the tidal power project at Eastport, Maine.

One of the major land use problems of the Saint John Valley has been that of using the bottomlands along the Saint John River between St. Francis and Van Buren. Under present conditions these plains, consisting of several thousand acres, have flooded and gullied to the extent that the owners have abandoned many of them. When relieved of the flood hazard these areas represent high quality agricultural land in an area where there is a limited amount of such land. The Upper Saint John River Hydroelectric Power Development apparently could be operated in such a manner as to give a high level of flood protection to the whole river plain. This would make it possible to develop and improve the flood plain land for more intensive agricultural use.

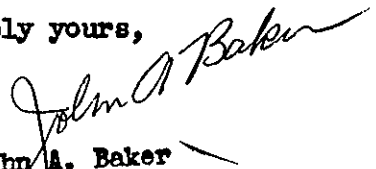
The impact of the total project on agriculture will be twofold--first, during the construction period and, second, during the operation and maintenance period. During the construction period there will be a favorable effect toward creating a local market for agricultural crops. This effect will, however, be local only. In the Eastport area this can be significant in that milk (hay and pasture and grain) and staples such as potatoes and truck crops will be in good demand as compared to the present low-level demand. However, an estimated 2,000 acres of land at each project location is expected to be converted from cropland to grassland or woods.

Once construction starts in either of the project areas many farmers may be expected to accept employment on the project. This would result in a considerable increase in income to rural residents, both in the Eastport area (Passamaquoddy) and in the Saint John River area. As project construction proceeds and as the power generated by the proposed projects becomes available to support industrial expansion, the additional employment opportunities which are created will help to mitigate the continuing economic and social adjustment which is foreseen for agriculture in this area. This would be the main project benefit to agriculture, although it could only accrue with the passage of time.

The proposed project development would have no adverse effect upon the programs of this Department and may be expected to result in some benefits to agricultural interests in the project area.

Thank you for providing this report for our review.

Sincerely yours,


John A. Baker
Assistant Secretary



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

NOV 18 1964

Stew:
Dear Mr. Udall:

Thank you for the opportunity to comment on the August 1964 supplementary report on the proposed Passamaquoddy Tidal and Upper Saint John River Hydroelectric Project.

We shall confine our comments to our area of competence - namely the portions of the report that deal with nuclear alternatives.

The economic data presented on page 74 for several different nuclear electric plant sizes appear reasonable. We suggest, however, that the economic data for the reference case nuclear electric plant shown on page 67 be modified. On page 67, the annual capacity charge is given as \$30.89/KW. On page 74, it is given as:

Plant Size <u>MW</u>	Annual Capacity <u>Charge, \$/KW</u>
300	32.9
430	27.9
625	24.8

We suggest that the nuclear alternative case be made up of either two 625 MW plants or three 430 MW plants. In both cases, these combinations amount to about the same capacity of the combined Quoddy-Dickey combination (1294 MW). This would result in using either \$24.8 or 27.9/KW-Year capacity charges for the nuclear alternative.

We believe this change would provide a more realistic comparison without undue compromise in the dependability of the nuclear alternative.

The Honorable Stewart L. Udall - 2 -

I would like to make two more general type comments. First, the report does indicate that with similar financing conditions, equivalent power could be produced more economically by either fossil or nuclear power plants. Whether federally or privately financed, these steam plant alternatives would initially cost around one fifth of the cost of the proposed hydro project.

Secondly, on page 81, the statement is made that "a nuclear (or fossil) power plant would have to be operated uneconomically to provide equivalent power" as the Quoddy-Dickey complex. While this statement is more or less correct, it is somewhat one-sided. The energy output of a hydro installation is limited by the characteristics of the water flow whereas fossil or nuclear plants are only limited by plant downtime for maintenance or refueling and system load characteristics. A more positive statement would indicate that the nuclear or fossil alternatives, in producing the same peaking power capability as the Quoddy-Dickey complex, would be capable of producing substantially more annual energy output. Thus, it might be more appropriate to replace the second paragraph of item b on page 81 with: "A Federal electric power plant (fossil or nuclear), if sized to provide the same peaking output as the Quoddy-Dickey complex, could provide substantially greater annual energy output than the hydro installation."

Sincerely yours,



Chairman

The Honorable Stewart L. Udall
Secretary of Interior



THE SECRETARY OF COMMERCE
WASHINGTON, D.C. 20230

DEC 20 1964

Honorable Stewart L. Udall
Secretary of the Interior
Washington, D. C. 20240

Dear Mr. Secretary:

We have prepared a careful review of the "Supplement to the July, 1963, Report on the International Passamaquoddy Tidal Power Project and Upper St. John River Hydroelectric Power Development." In September, 1963, we informed the Bureau of the Budget that we felt the proposal, as described in the earlier Report, was not feasible economically. Our reservations were based on:

1. The absence of an analysis of the potential market for power in New England.
2. The failure to consider alternative means of meeting the future power requirements in the region.
3. The under-estimate of the probable financing cost.

Because of the above reservations, the Commerce Department recommended that the proposed project not be authorized at that time.

We are pleased to note that, partly in response to the Commerce Department's comments, the Interior Department undertook a re-examination of the proposal. We are also pleased that a representative from the Commerce Department was invited to join the Advisory Board which reconsidered the proposal.

We have noted the several revisions made in the proposal. We are especially interested in the revised computations which now show a benefit-cost ratio for the entire project (St. John-Passamaquoddy combined) of 1.47 to 1.00; the Dickey and Lincoln School Projects benefit-cost ratio is 2.25 to 1.00, and the Passamaquoddy Project benefit-cost ratio is about unity, i.e., 1.04 to 1.00. These calculations are based on a 100-year project formulation and 3 per cent interest. The repayment analysis is about the same as outlined in the July, 1963, Report: an interest rate of 3 per cent

and payout within 50 years--after each unit becomes revenue producing; power rates would be at \$19.75 per kilowatt year of installed capacity and 3 mills per kilowatt hour for energy.

However, despite these revisions, the combined project still appears not to be economically feasible. It is true that the overall benefit-cost ratio has been raised from 1.27 to 1.00 to 1.47 to 1.00. However, the ratio for the Dickey-Lincoln School site has been reduced from 2.55 to 1.00 to 2.25 to 1.00. We feel that the Upper St. John River portion of the project appears to be economically feasible when viewed as an independent development.

While we are impressed with the majesty and grandeur of the proposal, we still have one of the basic reservations expressed about the 1963 Report: there is no adequate consideration of the alternative sources of power in New England. As the Interior Department's own figures show, the cost per unit of installed capacity for the Passamaquoddy-Dickey Project is \$19.75, or 38 per cent greater than the least costly of alternatives (which is the nuclear thermal plant). The cost per unit of installed capacity of pumped storage generating facilities is \$12.79, or 35 per cent below that for the proposed project. The cost of the conventional steam plant installation of \$13.90 would be 30 per cent lower than the proposed Passamaquoddy-Dickey Project. Other cost elements also appear to be against the proposed scheme. For example, the energy cost of Passamaquoddy-Dickey, at 3.0 mills per kilowatt hour, is almost twice that of the nuclear plant and equal to that for steam generation. While the energy cost of pumped storage, at 4.0 mills per kilowatt hour, exceeds that for Passamaquoddy-Dickey, the capital cost and the cost of installed capacity are clearly in favor of pumped storage.

Thus, if the question is posed in terms of the most economical means of satisfying the future power needs of New England (rather than in terms of harnessing the tides of Passamaquoddy) we think the answer lies in the direction of one of the alternatives shown.

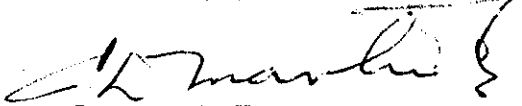
Aside from the benefits accruing during the construction period, there would be no gains for economic development in the region. While tourism in the Passamaquoddy area might be stimulated, the project's net contribution to area redevelopment is minor and transitory.

Thus, because we feel there should be a more adequate consideration of alternative sources of power in New England, we are still unable to recommend the construction of the Passamaquoddy-Upper St. John River Hydroelectric Power Development at this time. On the other hand, it appears that the Upper St. John River phase alone does merit development.

- 3 -

The attached staff review sets forth in detail the basis of our reservation concerning the combined project.

Sincerely yours,


Luther H. Hodges
Secretary of Commerce

Attachment

U. S. DEPARTMENT OF COMMERCE

December 1, 1964

Review of the Supplement of the July, 1963, Report,
The International Passamaquoddy Tidal Power Project and
Upper St. John River Hydroelectric Power Development

We have reviewed the August, 1964, supplement of the July, 1963, Passamaquoddy Report prepared by the Department of Interior. The economics of the project have not changed substantially from the July, 1963, report. The Interior Department has placed greater emphasis on an "initial plan." On the surface this appears to improve the benefit cost ratio for the combined Passamaquoddy - Dickey Project. However, on closer analysis, the project is still not economically feasible.

Background

In the "initial plan" the Interior Department proposes the construction of the Dickey reservoir and power plant with an installed capacity of 760 mw; the Lincoln School regulating reservoir and power plant with an installed capacity of 34 mw and an "initial" installation of a 500 mw power project at the Passamaquoddy Tidal Development.

This initial plan as proposed would have an installed capacity of 1,294 mw. The combined project would generate at site about 3 billion kilowatt hours and in addition, would probably provide for downstream benefits in Canada amounting to about 656 million kilowatt hours each year. The cost of the project proposed by the Department of Interior is \$896.4 million. This sum would include the transmission system costing approximately \$87 million. The revised computations now show a benefit-cost ratio for the entire project of 1.47 to 1.00, of which the Dickey and Lincoln School benefit-cost ratio is 2.25 to 1.00, and the Passamaquoddy project benefit-cost ratio would amount to about unity, or 1.04 to 1.00 (with a 100-year project formulation and 3% interest). The repayment

analysis is about the same as outlined in the July 1963, report: an interest rate of 3% payout within 50-years after each unit becomes revenue producing; rates at \$19.75/kw yr for capacity and 3 mills/kw hr for energy.

In addition, the supplement provides information on the transmission system which would interconnect these plants and deliver power to load centers in Maine and in the vicinity of Boston, Massachusetts. Information on the transmission system was not included in the earlier, July 1963 Report.

Revised Proposal

The Quoddy Power plant, as proposed now, would utilize the two pool plan proposed and described in the International Joint Commission's report of April 1961. As previously proposed the Quoddy Project would be operated primarily to provide peaking power to supply what is considered an expanded marketing area in New England and New Brunswick. An innovation has been proposed in the supplement: incorporation of reversible features in the turbines at Quoddy which would enable the generating units to be operated as pumps during the periods of neap tide so that Quoddy's dependable capacity could be determined by the installed capacity in the power houses and not necessarily by the volumes of water trapped in the neap tide.

At the request of the member agencies on the Joint Army - Interior Advisory Board, the Department of Interior did include some brief analyses of the comparable cost of providing energy and peaking power through alternative power sources, such as pumped storage and nuclear and fossil fuel thermal generation of energy. However, the analyses of these alternative sources of power is abbreviated and perhaps biased in the estimation of costs. Boston Edison's New Boston Station thermal plant will be installed at \$90/kw. This compares with a \$150/kw figure (on page 72 of the report) for a thermal power plant. Obviously Interior is using thermal plant cost data at least 10 years old.

While the case made for the Quoddy - Dickey project is treated at length without necessarily substantiating the need for so expensive a venture for only peaking power, inadequate treatment is afforded to the alternative means of meeting the future power requirements of the region. Despite the Department of Commerce's previous comments, the Department of Interior has not provided a detailed analysis of the potential market for power. This represents a serious shortcoming in the Department of Interior's report. Although the report indicates that the project would be expected to repay the investment during a 50-year period primarily through the sale of power through competitive rates, a comprehensive economic analysis of the prospective market supporting this assertion is not contained in the report. As a result, considerable doubt arises about the ability of the Interior Department to market annually 3 billion kw hrs of power 2 hours a day as proposed.

The report alleges that there are no true alternatives to providing the type of peaking power considered here except through the construction of the Quoddy - Dickey project. What is more, the Interior Department dismisses summarily gas turbines as a source of peaking power when in fact it represents a prime source at an initial capital cost of \$80/kw and boasts instant starting and remote control. There is no market analysis presented of the need for such peaking power.

Much stress is placed on the failure to "utilize a significant undepletable resource and source of energy which is constantly being wasted to the sea by the rise and fall of the tides in Quoddy Bay." Understandably enough, equal emphasis is not provided the extremely high cost of harnessing this source of energy.

Alternative Power Sources

The table shown below compares the capacity cost and capital cost in dollars per kilowatt terms for the proposed Dickey - Quoddy Project with alternative power sources. As

indicated in the table*, the capacity cost for the Quoddy - Dickey project is \$19.75 or 38 per cent greater than the least costly of the alternatives, which is the nuclear thermal plant. The pumped storage generating facilities which are dismissed so lightly by the Interior Department Report is \$12.79 or 35 % less costly than the Quoddy-Dickey project, and the conventional steam plant installation - at \$13.90 - would be 30% lower than the Quoddy - Dickey project.

Analysis of capital cost is equally interesting because it indicates the very high cost of installing the Quoddy aspect of the Quoddy - Dickey project. While the project as a whole figures out at \$693 per kilowatt, the Quoddy portion of the project alone is valued at \$1,138 per kilowatt. This compares with \$277 for the Dickey portion alone and the lowest alternative source of \$130 per kilowatt for a nuclear facility.

Obviously the nuclear power plant, as in the case of all thermal power plants, is essentially a base-load plant. Accordingly, when a nuclear plant operates as a peaking power plant, as is envisioned in the Quoddy - Dickey project, the full economic potential of the generation of power from the nuclear source is not realized. However, the potential for providing base-load power is an added argument for the construction of a nuclear plant as an alternative to a Quoddy plant.

Of the three alternative facilities suggested by the Department of Interior in its report, the most economical alternative for peaking purposes is a pumped storage facility. As indicated in the table, the capital cost for a pumped storage plant is \$196 per kilowatt which is roughly about one-fourth the cost of the combined Quoddy - Dickey project cost and about one-sixth the cost of the Quoddy portion of the Interior Department's proposal. On page 77 of the report

*All costs are computed on a comparable basis - Federal financing at 3 % interest - despite the fact that the Federal government has been paying 4% for long term funds for the last 5 years.

the Interior Department explains the necessity for having a low cost dependable power source for pumping water during off peak periods so as to reserve it for release during the peaking periods. The table suggests then that a combination of a pumped storage facility and the Dickey project would provide perhaps the least costly and most economic combination of all to achieve the same purposes as the originally proposed Quoddy - Dickey project. Sufficient energy would be available from the Dickey project for pumping during the off peak periods to enable a conveniently located pumped storage facility to provide for the peaking aspects of a combined project. Additionally, no credit seems to have been given for firm capacity available at Mt. Tom.

It is also apparent that if the entire cost of the Department of Interior's project (\$896.4 million) were used to install economical thermal plants near the load centers in New England or to construct pumped storage facilities near the load centers in New England, the resultant capacity would be four to five times that of the Tidal plant in firm power, including the peaking features which the Quoddy portion of the Interior plan would provide.

It is apparent from these cost data that no economic justification can be offered at this time nor in the foreseeable future for the construction of the Quoddy Tidal Power Development of the Quoddy - Dickey project.

The cost of the engineering and construction of the Quoddy Tidal Power Project (at \$569 million) we believe may be understated because this is the first attempt to harness the energy of the tides of the sea on this scale and under these unique conditions. However, if the Department of Interior is interested in the engineering and construction aspects of the Quoddy Project, the justification more logically should be in the same terms as those used in justifying our space program; national prestige, technological advances, engineering ability. Under either circumstance, in a period characterized by a stringent budget, it is hardly prudent to propose so costly and patently uneconomic a project.

Re-Development Benefits

In the case of the Passamaquoddy-Upper St. John River project, estimated benefits which directly pertain to area redevelopment consist of:

1. Benefits derived from wage payments to local area labor for project construction.
2. Benefits derived from project operation and maintenance.
3. Benefits derived from tourism stimulated by the project, largely in the Passamaquoddy area.

No claim is made in the project report that area redevelopment benefits will result from attraction of industries other than recreation to the vicinity of the power dams. The report does not contend that the project will provide power locally at such low rates as to act as a magnet to industry. Economic justification of the project instead is based on a comparison of power costs in New England, which costs are higher than those experienced in areas that have abundant fuel supplies. Consequently, it seems appropriate to exclude an estimate of area redevelopment benefits based on an assumed inducement to industry to locate in the redevelopment areas in Maine as a result of power to be available from the project.

Construction Benefits

An evaluation of benefits from wage payments for construction and operation and maintenance should note at the outset that construction benefits will occur within the few years when construction is undertaken, whereas benefits from operation and maintenance will occur almost entirely over the subsequent long period of time that the project is expected to operate. The impact of construction employment for such a large project is much greater than the impact of employment from operation and maintenance.

Wage benefits are to be considered, under the water-resource project guidance, only to the extent that they occur within the redevelopment areas for labor that would in the absence of the project be unutilized or underutilized. Payments to other areas and payments beyond the amounts needed to remedy local unemployment or underemployment are not to be counted as a part of the area redevelopment benefits. The report appropriately estimates these benefits by comparing the work requirements with the available local labor force. It excludes labor that would need to be brought into the area for the project. Part of the labor, of course, would come from Canada.

In order to achieve the area redevelopment benefits from construction estimated for the project, construction activity may need to be phased out to avoid a sharp peak.

Washington County, in which the Passamaquoddy power plant would be located, has a labor force of about 12,700 persons. About one-fourth of the work force is reported to be unemployed. Because of the large area covered by the County, part of the unemployed labor lives beyond commuting distance to the project. The 9,900 man-years estimated for local labor utilization in construction therefore may result in a peak labor requirement that exceeds the local labor availability.

The Upper St. John River (Dickey) portion of the project in northern Maine is in a sparsely populated area. The labor force is only about 3,000 within commuting distance (taken as a 40-mile radius). Reported unemployment in 1962 amounted to 10.7 per cent of the labor force in this area. Here again, the local labor utilization for construction, estimated in the report to be 2,200 man-years, may prove to be large in relation to the locally available labor force during the peak years.

Operation and Maintenance Benefits

The economic impact of payments to local labor for operation and maintenance is so much smaller than the impact of payments for local construction labor that no threat of

overstimulation exists from this source. At an average wage of \$5,000 per year, for example, only 162 persons would be employed on the Passamaquoddy segment and only 112 persons in the Dickey Dam area.

The area redevelopment benefits from wage payments from operation and maintenance are assumed in the report, in accordance with the prescribed guidance, to be limited to a period of 20 years and to decrease during the period. The descending scale recognizes that redevelopment areas typically do not stay distressed for indefinite periods and that benefits therefore should be claimed only for a reasonable period of time.

Recreational Benefits Not Included

The report does not classify recreational benefits as area redevelopment benefits. It includes them on an average annual basis over the 100 years used in the estimation of benefits and costs. The recreational benefits might be counted as area redevelopment benefits to the extent that they would reduce the underutilization of labor in the area. Such an allocation would not change the overall benefit-cost analysis for the project so long as total recreational benefits, including those that are not attributable to area redevelopment, are to be included.

The upsurge of tourist traffic in the summer and the probable sparse traffic in the other months of the year would present a problem of seasonal unemployment that would adversely affect efforts to increase the low annual earnings existing in the area. Benefits from construction, and especially from operation and maintenance, would be seasonally much more stable and more likely to yield higher annual earnings per worker.

We have noted the beneficial effects of the project to redevelopment areas in Maine, where this project is located, but we have not given any consideration to the detrimental effects that it might have on the coal fields of Appalachia. In view of the fact that 64 per cent of the power generated in the area comes from coal produced in the Appalachian

areas, we should call attention to the possibility that the project may in reality result in a transfer of employment and the benefit-cost ratio may not be as favorable as is anticipated.

Summary

In summary, we can see no economic justification possible for supporting the construction of the Passamaquoddy Tidal Power Project. If such a construction project is deemed desirable by the Administration a justification should be phrased on the basis of national prestige. The Dickey project is, however, apparently economically justifiable on the basis of a 500 mw firm capacity with 750 mw installed and the benefits that would be derived from flood control. However, this portion of the Department of Interior's overall project is not the primary component of the Interior plan.

COMPARATIVE COSTS* FOR ALTERNATIVE POWER SOURCES
PASSAMAQUODDY-DICKEY PROJECT

<u>Project</u>	<u>MW Capacity</u>	<u>Capital Cost (\$/KW)</u>	<u>Annual Capacity Cost (\$/KW)</u>	<u>Energy Mills/ KW</u>
Quoddy-Dickey Total	1,294	693	19.75	3.0
Quoddy (alone)	500	1,138	x	x
Dickey (alone)	760	277	x	x
Lincoln (alone)	34	49	x	x
Steam Plant	425	166	13.90	3.0
Nuclear	625	130	12.40	1.6
Pumped Storage				
Mt. Tom (Mass.)	400	196	12.79	4.0
Rowe (Me.)	500	135	12.70	4.0
Woodstock (N.H.)	670	150	11.19	4.0

*All costs are computed on a comparable basis -- Federal financing at 4% interest.

U. S. DEPARTMENT OF LABOR

OFFICE OF THE SECRETARY

WASHINGTON

SEP 18 1964

The Honorable Stewart Udall
Secretary of the Interior
Washington, D. C.

Dear Mr. Secretary:

This is in further reference to your letter of August 11, 1964, requesting Department of Labor comments on the proposed report of the International Passamaquoddy Tidal Power Project and the Upper Saint John River Hydroelectric Power Development, and "Supplement to the July 1964 Report" dated August 1964.

We have reviewed the report and supplement in the light of the impact the construction of the Tidal Power Project and the Upper Saint John River Hydroelectric Power plant will have on job opportunities in the area. The completion of the project will provide additional recreational and tourist facilities in the area and will result in an appreciable increase in job opportunities over a period of years in the service industries.

In view of all considerations, the Department of Labor is pleased to inform you that it endorses this project. This assumes that the project is otherwise economically sound and feasible and meets the standards set forth in the pertinent laws.

Yours sincerely,

W. Willard Wirtz
Secretary of Labor



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
WASHINGTON, D.C. 20201

BUREAU OF STATE SERVICES

REFER TO:

December 8, 1964

Dear Mr. Secretary:

The opportunity to review the "Supplement to July 1963 Report The International Passamaquoddy Tidal Power Project and Upper Saint John River Hydroelectric Power Development, August 1964" is sincerely appreciated. Our review has also included the earlier report of July 1963 by your Department, as well as reports on this power project by the International Joint Commission, April 1961, and by its Advisory Boards. The information in the subject report and other reports indicated has been found most interesting and helpful in recent studies, which have given attention to sanitation problems, and possible effects of the tidal project on dissipation of residual pollution in the tidal estuary of the St. Croix River.

From these studies it is concluded that these problems can be satisfactorily resolved, and that they can be effectively taken care of prior to or in conjunction with the construction of the International Passamaquoddy Tidal Power Project.

Sincerely yours,

L. F. Warrick
Technical Services Consultant
Division of Water Supply and
Pollution Control

Honorable Stewart L. Udall
Secretary of the Interior
Washington, D. C.



THE SECRETARY OF THE TREASURY
WASHINGTON

NOV 17 1964

Dear Stewart:

In reply to your letter of August 11, I am pleased to have an opportunity to comment further on the proposed Passamaquoddy Tidal Power Project, and I greatly appreciate your offer to include my comments in your Department's final report to the Congress on the project.

As background to my remarks, I should first mention that the Treasury Department has for some time been quite concerned about the appropriateness of the interest rate formula presently used for the cost-benefit and reimbursement calculations for water and related land resource development projects. As you know, the formula is based on a recommendation contained in the Report, dated May 15, 1962, of the Secretaries of the Army, Interior, Agriculture, and HEW, which was printed as Senate Document No. 97, 87th Congress, Second Session. The Report recommended that the interest rate to be used in plan formulation and evaluation "shall be based upon the average rate of interest payable by the Treasury on interest-bearing marketable securities of the United States outstanding at the end of the fiscal year preceding such computation which, upon original issue, had terms to maturity of 15 years or more." The Treasury Department was not consulted in regard to the interest rate formula in Senate Document 97, and we have felt impelled to urge on a number of occasions that an early reconsideration be undertaken. Such reconsideration would be consistent with the statement in the Report that "This procedure shall be subject to adjustment when and if this is found desirable as a result of continuing analysis of all factors pertinent to the selection of a discount rate for these purposes." Moreover, although the Report states that the discount rate established for purposes of formulating and evaluating plans "shall not be construed as establishing the.... rate of interest to be used in reimbursement and cost-sharing arrangements," in practice the same rate is being used for both purposes. Thus, we feel it is imperative to move toward adoption of a more appropriate interest rate in order to provide for a more accurate portrayal of project costs and more equitable cost-sharing arrangements.

In this Department's judgment, the interest rate most appropriate for both cost-benefit analysis and the determination of reimbursement and cost sharing arrangements should reflect the Government's current borrowing costs and, therefore, should be determined on the basis of current market yields on outstanding long-term Treasury obligations. At the present time, the market yield on long-term obligations is close to 4-1/4%, compared to the 3% rate used in the analysis of the proposed

project. This measure of the Government's borrowing cost, I should add, was adopted by the Treasury more than a decade ago and was endorsed early last year in the Report of the President's Committee on Federal Credit Programs.

We have used a $4\frac{1}{4}\%$ rate in analyzing the figures appearing in the Supplementary Report. We have not taken into account the fact that short-term interest rates are somewhat lower than long-term interest rates. If this adjustment were made it would have the effect of reducing the computed benefit-cost ratios, since the costs incurred in the earlier years would be discounted at a lower rate than the benefits received in the later years. We have also computed the ratios for benefit periods of 50 years, 100 years, and to infinity. The effect of going to infinity on benefits, rather than limiting the period to 100 years as is done in the Supplementary Report, is to increase the present value of the benefits by approximately 2%. On the other hand, on the more normal 50 year appraisal, the present value of the benefits would be 15% less than for 100 years.

In carrying out our analysis, we also found some relatively minor, but unexplained, discrepancies between the figures appearing in Chapter VIII, Economic and Financial Analysis, and those appearing in other chapters, particularly Chapter VII, Cost Estimates. In the interest of consistency since the differences do not appear to be significant in relation to the overall uncertainties necessarily involved in a project of this size, we have used the figures appearing in Chapter VIII wherever possible. We have also accepted your estimates of annual benefits and costs. We think it not unlikely, however, in view of past experience, that the costs, in particular, may be seriously under-estimated. Apart from the usual cost escalation, which seems to occur in every project, the novel features of the Passamaquoddy portion of the project appear to introduce an additional degree of uncertainty.

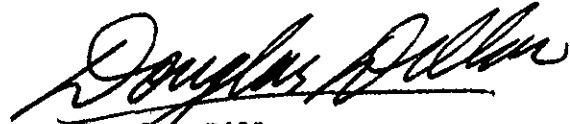
The results of our analysis are summarized in the attached tables. We find that the Dickey-Lincoln project has a benefit-cost ratio of 1.7 and, consequently, would appear to warrant further consideration. On the other hand, considered apart from the Dickey-Lincoln Project and using the $4\frac{1}{4}\%$ discount rate which we believe is more appropriate than the 3% rate used in the Report, the Passamaquoddy Project has a benefit-cost ratio of less than one. This certainly raises difficult questions for the economic justification.

In giving any further consideration to the Dickey-Lincoln project, we assume adequate account will be given to the policy of budgetary restraint and that the costs can be absorbed through cut-backs in less essential programs. We also note that the flood protection benefits could be achieved by an expenditure of \$1,060,000 and that, after allowance for any savings which might be realized by reduced transmission line costs, the power produced by the Dickey-Lincoln project could be produced by either steam or atomic energy at an approximately comparable cost. We find the discussion of the alternative power sources, however,

to be somewhat unclear and, consequently, this conclusion is tentative. We also wonder whether the estimated cost of atomic energy power generation reflects the most recent experience and makes due allowance for the technological progress which should be realized within the next few years.

With best wishes,

Sincerely,



Douglas Dillon

The Honorable
Stewart Udall
Secretary of the Interior
Washington, D. C.

Enclosures

DEPARTMENT OF STATE
WASHINGTON

November 20, 1964

Dear Secretary Udall:

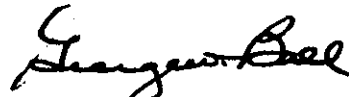
I refer to your letter of August 14 asking for this Department's comments on the August 1964 "Supplement to July 1963 Report, The International Passamaquoddy Tidal Power Project and Upper Saint John River Hydroelectric Power Development."

As you know, both phases of this project involve the participation of the Government of Canada. Portions of the proposed tidal power project are in Canadian territory and the upper Saint John River development will affect the flow of the lower portion of the river which lies in Canada.

You will also recall that the Passamaquoddy tidal project has been studied jointly by the United States and Canada in the International Joint Commission. Your Department's further studies and reports of July 1, 1963 and August 1964 have been transmitted to the Canadian Government, and technical discussions between the United States and Canadian officials have been held to explore some of the findings in the July 1963 report. The Canadian Government was also informed that interested United States agencies had been asked to comment on the Supplement of August 1964. Since internal United States Government consideration is not completed, formal negotiations with the Canadian Government on specific proposals are not yet feasible.

When the review of the report is completed and it has been approved by the President, the Department of State would be happy to propose to the Canadian Government formal negotiations if that should be deemed desirable.

Sincerely yours,


Acting Secretary

The Honorable
Stewart L. Udall,
Secretary of the Interior.

LETTERS OF COMMENT

FROM GOVERNORS OF NEW ENGLAND STATES



STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA

JOHN H. REED
GOVERNOR

October 9, 1964

The Honorable Stewart L. Udall
Secretary of the Interior
Washington, D. C.

IP
- Passamaquoddy

Dear Mr. Secretary:

These comments are supplementary to my previous letter to you endorsing the July 1, 1963, report to President John F. Kennedy entitled "The International Passamaquoddy Tidal Power Project and Upper Saint John River Hydroelectric Power Development."

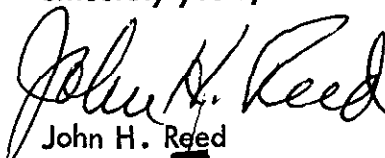
We have examined the supplement to the above report, issued August 12, 1964, and believe that it strengthens our conviction that the Passamaquoddy-St. John River project not only will serve the national interest but will benefit the State of Maine, The New England States and the Maritime Provinces of Canada, now and in the future.

We further believe that the Passamaquoddy-St. John River Project, with its transmission line from the Maine - Canadian borders to Southern New England, could be the cornerstone of a great International Northeast Power Grid stretching from the Atlantic Provinces of Canada to New York State, where it would be connected with similar strategic power grids now being perfected to serve major areas of this Nation and Canada.

The Northeastern section of the United States is the last remaining great economic area of our Nation which has had no great public works complex authorized by the Federal Government for power, water conservation and flood control, such as have been established in the Southeast, the Southwest, the Northwest and the Mid-Continent.

We believe the time has now come for the Federal Government to institute such a long-range program in this region by building the Passamaquoddy-St. John River project.

Sincerely yours,


John H. Reed
Governor



STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA

JOHN H. REED
GOVERNOR

November 30, 1964

Honorable Stewart L. Udall
Secretary of the Interior
Washington, D. C.

Dear Mr. Secretary:

My earlier letter to you regarding your formal request for our views on the August 1964 report of the Passamaquoddy International Tidal Power Project-Upper St. John River Development, is amended to include significant comments from several officials of our Maine State Government which were not available at my earlier writing.

After reviewing these comments, copies of which I enclose, I feel that your final report to the President and to the Congress should include these supporting statements.

Sincerely yours,

A handwritten signature in cursive script that reads "John H. Reed".

John H. Reed
Governor

JHR:md

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PARK PLANNER
ALFRED L. WALLEN
SUPERVISOR OF OUTDOOR RECREATION
RODOLPH C. SANBORN
ACCOUNTANT

State Park & Recreation Commission

AUGUSTA, MAINE 04330

November 1, 1964

AREA CODE 202
423 4511 EXT. 501

Governor John H. Reed
State Capitol
Augusta, Maine

Dear Governor Reed:

The following are my comments with respect to the August 1964 report of the Passamaquoddy-St. John River Study Committee:

It seems to me that the projections of the Bureau of Outdoor Recreation estimating average annual benefits from visitor-day revenue may be too conservative.

Both Passamaquoddy and the St. John River projects would open up large new areas suitable for a diversity of recreational park developments and thus contribute greatly to the economy of these areas and the State as a whole, which have an historic and substantial orientation toward recreational "open space" use.

One feature especially of the Department of the Interior assumptions for the St. John River development calls for the preservation of the Allagash River as a primitive, unspoiled wilderness waterway. Whether this preservation is to be achieved under Federal, or State, or combined control still is a moot question at this time, but I am sure that suitable arrangements eventually will be worked out.

Please be assured of the desire of this Department to work cooperatively with Federal agencies for the determination of the best interests of the people of Maine and the Nation.

Sincerely yours,

Lawrence Stuart
Lawrence Stuart
Director

LS/enc

COMMISSIONERS
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CHAIRMAN
CARL M. STILPHEN
BERTRAND A. LACHARITE

VAUGHAN M. DAGGETT
CHIEF ENGINEER



Maine State Highway Commission

AUGUSTA, MAINE 04330

October 20, 1964

Governor John H. Reed
State Capitol
Augusta, Maine

Dear Governor Reed:

Having reviewed the Department of the Interior's August 1964 report on the Passamaquoddy International Tidal Power Project---Upper St. John River Development, I would like to report the following:

1. I believe the report is deficient in that it does not make a realistic appraisal of the transportation, commercial and recreational benefits which the road construction resulting from the project would produce.

2. A further deficiency, in my opinion, is that the report does not adequately assess the area redevelopment benefits which such road and highway construction would create.

This opinion is based on the projected seven miles of highway which would top the dikes and dams of the Passamaquoddy Project, connecting the islands of Passamaquoddy Bay and for the first time providing highway access to the islands and coastal points in this extensive area of Eastern Maine and the Province of New Brunswick.

Without the dikes and dams to be built between the string of islands skirting Passamaquoddy Bay, which are essential to the proposed tidal power project, these seven miles of connecting highways would not be financially feasible.

At your request we are ready to make a further study of the economic benefits to be derived from this new highway network. At present, however, it is safe to say that present projections of area redevelopment benefits expressed in the Interior Department's report of August 1964 are inadequate in terms of highway benefits, in my opinion.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "David H. Stevens".

David H. Stevens, Chairman
Maine State Highway Commission

DHS/b



DEPARTMENT
OF ECONOMIC
DEVELOPMENT

STATE HOUSE

AUGUSTA, MAINE 04330

(207) 623-4511

STANDISLEY BALDWIN

October 21, 1964

Governor John H. Reed
State Capitol
Augusta, Maine

Dear Governor Reed:

I have reviewed the August 1964 supplemental report of the Department of the Interior on the Passamaquoddy International Tidal Power Project---Upper St. John River Development and submit the following comments:

1. I do not believe the report sufficiently stresses the economic benefits which would accrue to Maine, the New England States and the nation in the construction and operation of these projects.

2. While engineering estimates have been presented on the total number of man-years involved, the experience of other regions where great construction projects have been undertaken provides abundant record of the extent and intensity of both direct and indirect economic impact. Great new payrolls, retail trade, new home construction, expansion of banking and other service industries, and diversified manufacturing, would be only a part of the economic expansion developing over a period of years.

3. The State of Maine has possibly the most years of experience with the tourist industry of any State in this nation, dating back more than 125 years. We have always found that the quickest and most diffuse economic response from developments of this magnitude come in the tourist and recreation industry. We are inclined to believe that the projections of the Department of the Interior on the number of visitor-days in these project areas during the initial fifteen to twenty-year period are much too low.

Governor John H. Reed
Page Two
October 21, 1964

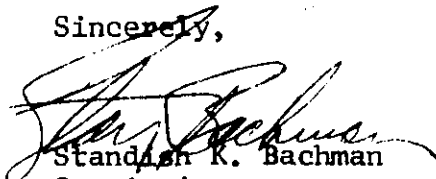
We also firmly believe and confidently predict that---amazing as it sounds to those not familiar with the recreation-tourist industry---the area and regional income from tourism alone created by these projects will one day be greater than the revenue from the sale of electric power!

In the Passamaquoddy Project we will have a marvel of modern engineering that will attract the attention of the world. A unique geographical layout of dams and dikes connecting a series of islands, with highways superimposed, would connect the eastern coast of Maine with the southern coast of New Brunswick. The only similar highway system in the world today is that which connects the Florida Keys, which also was constructed by the Federal Government to the great economic benefit of southern Florida.

4. It is the considered and unanimous opinion of the professional staff of this Department that the Passamaquoddy-St. John River Projects would become the greatest single source of economic development in the entire history of the State of Maine and New England. Recent economic studies have concluded that only a massive injection of capital investment in the area will generate the extensive creation of economic opportunities in which our region currently is deficient as compared with the other great regions of this continent.

This Department, in accordance with your instructions of more than a year ago, stands ready to assist in every way possible in the furtherance of these projects for the benefit of Maine, New England and the nation.

Sincerely,



Standish K. Bachman
Commissioner

SKB:jb



STATE OF MAINE
DEPT. OF HEALTH AND WELFARE
AUGUSTA

November 10, 1964

DEAN FISHER, M. D.
COMMISSIONER

The Honorable John H. Reed
State House
Augusta, Maine

Dear Governor Reed:

In response to your request for comments on the Department of the Interior's August 1964 Report on the Passamaquoddy-St. John River Project, it would seem to me that not enough attention has been paid to the Area Redevelopment Benefits, especially as they apply to our cooperative efforts with the Federal Government in the President's "war on poverty."

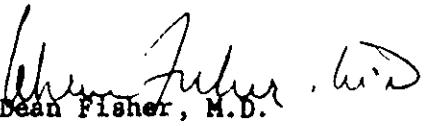
The latest statistics available from a Human Resource Development Research Project conducted by the University of Maine show that Washington County Maine where the Quoddy Project is located has 41.8 percent of its families with less than \$3,000 annual income.

These statistics rate Washington County as the "poorest" in Maine. Aroostook County, where the St. John River development is located, lists 31 percent of its families below the same standards. The State of Maine as a whole, in this study, shows 22.8 percent of its families with incomes below the minimum standards of Federal anti-poverty legislation.

As Chairman of your State Economic Opportunity Committee, I believe that these latest figures should be brought to the attention of the President and the Congress in the hope that Area Redevelopment-anti-poverty benefits may be more properly assessed in the proposed Passamaquoddy-St. John River developments.

It also would be my hope that if these projects are authorized the appropriate Federal and State agencies would be directed to draw up adequate land use plans and goals for the areas involved. I am not aware that comprehensive discussions have been held on this phase of planning for the future in these localities.

Sincerely yours,


Dean Fisher, M.D.
Commissioner

COMMISSIONERS
FREDERICK N. ALLEN
CHAIRMAN
DAVID K. MARSHALL
EARLE M. HILLMAN



LEONA M. DELAWARE
CLERK

Public Utilities Commission

STATE OF MAINE
AUGUSTA, MAINE 04330

November 23, 1964

The Honorable John H. Reed
The Governor of Maine
Augusta, Maine

Dear Governor Reed:

In response to your request for comments on the August 1964 report of the Department of the Interior regarding the Passamaquoddy—St. John River projects, may I assure you that, following your executive instructions, this Department stands ready to cooperate with the Federal Government and other agencies of State Government in the furtherance of such projects as may be authorized by the Congress.

Among the benefits I can foresee for the State of Maine would be a considerable increase in the electric power demand from our existing utilities, which are almost entirely investor-owned. This increase in load, with its resulting increase in total revenues to these existing utilities, would occur not only in the construction phase of these projects, but in the resulting economic expansion which would be felt in varying degree throughout the entire State.

It is obvious that the projected generation of electricity from these projects would be far greater than our existing Maine utilities could absorb at their current growth rates. However, I believe that provision should be made for transmission line take-offs to our existing distribution systems, so that any benefits accruing from lower-cost power might be available to our existing utility systems.

Please be assured that we will continue our active interest in developments arising from these projects and that we will be most happy to cooperate in working out whatever details may come within our province under the State of Maine statutes creating this Department.

Sincerely yours,


Frederick N. Allen
Chairman

FNA:hhr

STATE OF MAINE

Inter-Departmental Memorandum Date November 23, 1964

To The Honorable John H. Reed

Dept. Executive

From Ronald W. Green, Commissioner

Dept. Sea and Shore Fisheries

Subject Passamaquoddy Tidal Power Project

We have long been concerned with the problems of marine fisheries which have been raised in the studies of the Passamaquoddy Tidal Power Project.

In fact, the Department of Sea and Shore Fisheries, under contract to the Department of the Interior, did all the biological research on the United States side of the project site except for the studies on sea herring.

The Department of Sea and Shore Fisheries, as a result of nearly two years of research, concluded that conditions will generally be improved by the project for resident fish and shellfish species.

Anticipated reductions in erosion, scouring and turbulence together with higher water temperatures resulting from impoundment and the less rapid transportation of soluble compounds and mineral elements carried into the area and by fresh-water runoff should enhance the supply of fish- and shellfish-supporting nutrients.

Only a few groundfish species would likely be adversely affected within the upper and lower pools. These same species would be available outside the impoundment in their usual abundance.

It is requested that these views be presented formally to Secretary of the Interior, Stewart L. Udall.

RWG:gnk

Ronald W. Green



ENDICOTT PEABODY
GOVERNOR

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT
STATE HOUSE, BOSTON

December 8, 1964

Honorable Stewart L. Udall
Secretary of the Interior
United States Department of the Interior
Office of the Secretary
Washington, D. C. 20240

Dear Mr. Secretary:

Please be advised of my full support of
the Quoddy-St. John River Hydro-Electric Project.

This project promises an economic uplift
for all New England and this is the reason for my
enthusiastic support, although it will have little
affect on Massachusetts. It will bring to New England
for the first time, a project of the magnitude which
have been given in the past frequently to southern and
western sections of the Country.

Kindest regards.

Sincerely,

A handwritten signature in cursive script, reading "Endicott Peabody".

Governor



JOHN W. KING
GOVERNOR

STATE OF NEW HAMPSHIRE
CONCORD

December 17, 1964

Honorable Stewart L. Udall
Secretary of the Interior
U. S. Department of the Interior
Washington, D. C.

Dear Secretary Udall:

This is to state that the proposed Passamaquoddy Power Project has my complete and unequivocal support.

Like other governors of New England, I am deeply concerned about the fact that New Hampshire power rates are the highest in the entire United States. Not only are our domestic consumers paying substantially higher rates than in other sections of the country, but an even greater concern is the fact that our excessively high rates frequently militate against the attraction of new industry in this area.

It is my belief that the construction of the Passamaquoddy project could substantially ease the present problem, and I am sincerely hopeful that the Congress will take positive action in this direction.

Sincerely,

John W. King

JWK:n6

JOHN DEMPSEY
GOVERNOR



STATE OF CONNECTICUT
EXECUTIVE CHAMBERS
HARTFORD

January 4, 1965

The Honorable Stewart L. Udall
Secretary of the Interior
Washington, D. C. 20240

Dear Secretary Udall:

This letter is in response to a request made by your office for a statement regarding the Passamaquoddy--St. John River hydro-electric project.

At my request, the Public Utilities Commission of this state studied the reports that have been filed on the project to determine its probable direct effect, if any, on the State of Connecticut.

The Chairman of the Commission, Mr. Eugene S. Loughlin, has in reply made the following statement:

"I would say that this (Passamaquoddy) project would have little or no effect upon the future supply of electricity for Connecticut and, therefore, no effect on the cost of electricity for Connecticut.

"This is based upon the fact that with the projected estimates of use, all of the proposed power generation of these projects, if found to be economic, would be used north of Connecticut.

"I might state that at the present time, Connecticut Yankee Atomic Power Company has under construction a 500 mega-watt plant in Haddam Neck, Connecticut.

"If the present trend in nuclear development continues to reduce the cost of nuclear power plants, this plant may well be the forerunner of larger and more efficient nuclear stations for the supply of the Connecticut area."


The Honorable Stewart L. Udall - 2 -

January 4, 1965

Accepting the view of Chairman Loughlin that the Passamaquoddy project would have no direct effect on this State, I nevertheless feel that anything that would directly benefit part of a region such as New England would be beneficial to the entire region.

I am awaiting with interest the report of a subcommittee on power and power rates in New England which has been appointed by the New England Governors' Conference. The subcommittee, with Governor Philip Hoff of Vermont as chairman, will, of course, review the Passamaquoddy project in preparing its report.

Sincerely,


Governor

D:s1

PHILIP H. HOFF
GOVERNOR



STATE OF VERMONT
EXECUTIVE DEPARTMENT
MONTPELIER

February 27, 1965

The Honorable Stewart L. Udall
Secretary of the Interior
Washington, D.C.

Dear Mr. Secretary:

We appreciated receipt of the copy of the proposed report on the International Passamaquoddy Tidal Power Project and the Upper Saint John River Hydro-electric Development dated August 1964 and feel that this project will provide benefits to the people in the State of Vermont, as well as the entire New England area.

We note the contribution that this project will make to the electric power supply of the New England area and recognize that there are two power generation sources, namely, the Dickey-Lincoln School conventional hydroelectric power development and the Passamaquoddy Tidal Power Project. The project evaluation demonstrates the economic feasibility of the project.

We are particularly pleased to observe that the report contemplates stage construction with early emphasis being placed on the Dickey-Lincoln School portion.

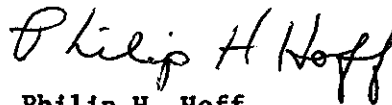
We further urge early emphasis on planning and development of a region-wide grid system. We feel strongly that only such a grid system will provide the means for the full realization of the potential of both projects.

We hope that you will continue to study methods of reducing cost so as to be in a position to harness the tides at Quoddy by improving the efficiency and reducing costs of axial flow turbines and reducing cost of underwater dams.

- 2 -

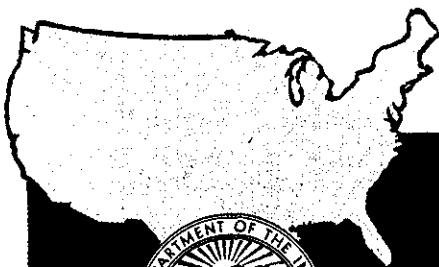
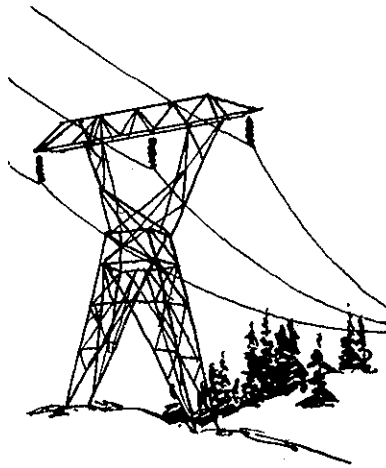
We emphasize the advisability of a New England wide grid to transmit and distribute the power. This should be included in your plan.

Sincerely,

A handwritten signature in cursive script that reads "Philip H. Hoff". The signature is written in dark ink and is positioned above the printed name and title.

Philip H. Hoff
GOVERNOR

PHH:pbl



In its assigned function as the Nation's principal natural resource agency, the Department of the Interior bears a special obligation to assure that our expendable resources are conserved, that renewable resources are managed to produce optimum yields, and that all resources contribute their full measure to the progress, prosperity, and security of America, now and in the future.

U.S. Department of the Interior